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(Original Official Organ U. S. Vet. Med. Assn.)
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The American Veterinary Medical Association

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JOURNAL

OF THE

American Veterinary Medical Association

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(Original Official Organ U. S. Vet. Med. Ass'n.)

H. Preston Hoskins, Secretary-Editor, 716 Book Building, Detroit, Mich.

L. A. Merillat, President, Chicago, Ill. M. Jacob, Treasurer, Knoxville, Tenn.

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THE NEXT MEETING PLACE

By the time this is read, the American Veterinary Medical Association will have made some decision relative to the meeting place for 1926. Either the Association will have made the selection definitely, or it will have been left to the Executive Board to decide. It is hoped that the latter course will be pursued.

Four of the five meetings, from 1921 to 1925 inclusive, have gone to cities west of the Mississippi. The other meeting was in Canada. It would appear that either the South or the East should have the next meeting. It is a safe guess that a very large majority of those in attendance at Portland will not attend the 1926 meeting if it is held east of the Mississippi River. The same may be said of those in attendance at most any meeting of the Association. A very small percentage of the members attend meetings regularly, regardless of location. The Executive Board necessarily is balanced geographically and, if for no other reason, it should be a safe procedure to leave the selection of all meeting places in the hands of the Board.

A LITTLE BOOKLET

In connection with working out some plans along the line of publicity, there has been published a little booklet bearing the title:

THE VETERINARIAN
Who Is He?
What Is He?
What of His Future?

This booklet was intended for home consumption, that is, it was prepared for distribution *entre nous*—a sort of family affair, so to speak. Evidently it has struck the spot, if we may be allowed to judge from some of the comments already received. Here is one:

> "Your letter of July 1 enclosing booklet on the veterinarian received this morning. I cannot put in words just what I felt, except to assure you that your letter and booklet seem to furnish me inspiration and confidence which I was badly in need of at this time."

Another veterinarian, one who already has to his credit considerable publicity work on behalf of the veterinary profession, wrote in and made the following suggestion:

> "I also have read with a good deal of interest, the little booklet entitled, "The Veterinarian." Literature of this kind is very interesting to most of us, but in my opinion, if it has no wider distribution than to veterinarians only, it will fail to accomplish the great good that might be expected from it. If a booklet of this kind could be placed in every high school in the United States, and also in the hands of editors of live stock journals, it would serve a much wider usefulness. I am making this as a suggestion."

It is our plan to follow this booklet with others, at intervals, during the coming year. The next one, according to present plans, will be one that members of the A. V. M. A. may hand to their clients. Or, if preferred, one may be enclosed in each letter or statement sent to a client. The booklet will tell the client what the A. V. M. A. is, what it stands for, and will incidentally be a pretty strong boost for the profession. Be on the watch for announcements concerning these booklets. If you have not seen the first one, "The Veterinarian," write and ask for a copy. If you have received one, and want to part with it, hand it to some member of the profession who has not seen it and who may need a little inspiration.

AN IMPORTANT ANNOUNCEMENT

Members have been sent statements for dues for $1.67—for the balance of 1925. By way of explanation, members are referred to one of the amendments adopted at Des Moines, last year, changing the Association year and making it correspond with the calendar year. Members holding 1924 membership cards paid dues up to September 1, 1925. Although the cards read "1924," only one-third of the year covered by these dues was in 1924, and two-thirds in 1925. The change necessitates the collection of dues for the last one-third of 1925—September 1 to December 31—and when $1.67 is received, a member will be issued a card bearing the year date "1925."

The dues for 1926 will be $5.00, just the same as usual. Notices that these dues are payable will be mailed about November 1, to members who have not already paid them. Up to this writing, about 40 per cent of those remitting the balance of the 1925 dues have included $5.00 for 1926. Cards for 1926 will be mailed later.

WE HAVE MOVED

On July 1, we moved the A. V. M. A. headquarters, not very far—about a hundred yards—but just far enough to give us a new address. We are now at 716 Book Building, instead of 735. There were several reasons why it was desirable to move, not the least important of which was the fact that we are growing and needed a little more room. Our new quarters are somewhat better adapted to our requirements, and we hope it will not be necessary for us to move very soon again.

Considerable property has been accumulated during the past three years, and we believe that we are now better able to serve our members than ever before. Our library is growing rapidly. Our files of records of all sorts are now orderly arranged, so that we have within convenient reach a vast store of information, data, statistics, lists, reports, reprints, catalogues, etc. Our aim is to make the office a place where any veterinarian may get any information he wants. Many of our members have already found the office ready to serve them in this capacity.

APPLICATIONS FOR MEMBERSHIP

(See April, 1925, JOURNAL)

FIRST LISTING

ANDERSON, BEN — Worthington, Minn.
D. V. M., Iowa State College, 1925
Vouchers: W. F. Guard and C. H. Covault.

BRINKMAN, NORMAN HENRY — Collins, Iowa.
D. V. M., Iowa State College, 1925
Vouchers: W. F. Guard and C. H. Stange.

CORE, O. H. — 721 State Office Bldg., Lansing, Mich.
D. V. M., Chicago Veterinary College, 1913
Vouchers: B. J. Killham and C. H. Clark.

EMMER, FRANK J. — Richmond, Mich.
V. S. ,Ontario Veterinary College, 1908
B. V. Sc., Ontario Veterinary College, 1916
Vouchers: H. Preston Hoskins and B. J. Killham.

FERGUSON, GEORGE ALBERT — 505 Loyal St., Danville, Va.
D. V. M., United States College of Veterinary Surgeons, 1920
Vouchers: Wm. G. Chrisman and H. H. Adair.

GITZEN, GILES A. — 111 No. Fir St., Medford, Ore.
D. V. M., San Francisco Veterinary College, 1917
Vouchers: Thomas B. Carter and G. H. Huthman.

HORNING, J. G. — 1711 Preston Ave., Houston, Tex.
D. V. M., McKillip Veterinary College, 1913
Vouchers: A. A. Lenert and R. P. Marsteller.

HUFFMAN, WARD T. — 339 State House, Boise, Idaho
D. V. M., Grand Rapids Veterinary College, 1908
Vouchers: J. D. Adams and F. E. Murray.

LANIGAN, OSCAR JOHN — 633 Live Stock Exch. Bldg., So. St. Paul, Minn.
D. V. S., Chicago Veterinary College, 1888
Vouchers: G. E. Totten and J. N. Holzer.

LIZANA, FERNAND J. — 2106 No. Clairborne Ave. New Orleans, La.
D. V. M., Ohio State University, 1925
Vouchers: David S. White and Jas. D. Grossman.

MORENCY, H. L. — Box 387, Boulder, Colo.
D. V. M., Colorado Agricultural College, 1925
Vouchers: George H. Glover and H. Preston Hoskins.

NIELSEN, N. E. — University of Nevada, Reno, Nev.
M. D. C., Chicago Veterinary College, 1906
Vouchers: Edward Records and Lyman R. Vawter.

NYLINE, ARVID W. — c/o Y. M. C. A., Clinton, Ill.
D. V. M., Iowa State College, 1925
Vouchers: H. E. Bemis and W. F. Guard.

RANKIN, JOHN F. — Foot of 7th St., Astoria, Ore.
D. V. M., Colorado Agricultural College, 1922
Vouchers: Thomas B. Carter and G. H. Huthman.

REID, RALPH PRESTON — 847 So. Iowa Ave., Washington, Iowa
D. V. M., Iowa State College, 1925
Vouchers: W. F. Guard and C. H. Covault.

SCHAFER, CLAUDE CHRISTOPHER — Linden, Mich.
V. S., Ontario Veterinary College, 1908-1911
Vouchers: B. J. Killham and H. Preston Hoskins.

SHOLL, LLOYD B. — Michigan State College, East Lansing, Mich.
B. S., University of Wisconsin, 1917
D. V. M., Cornell University, 1923
Vouchers: E. T. Hallman and Ward Giltner.

STAPP, EARL W. — 2226 Perry St., Detroit, Mich.
D. V. M., Indiana Veterinary College, 1924
Vouchers: E. P. Schaffter and Ashley G. Stamp.

VAN VLIET, JOHN W. — Brookings, So. Dak.
D. V. M., Kansas State Agricultural College, 1922
Vouchers: John B. Taylor and R. R. Dykstra.

APPLICATIONS PENDING

SECOND LISTING

Allen, James S., Nampa, Idaho.
Cullen, J. T., 634 Exchange Bldg., South St. Paul, Minn.
Green, H. H., c/o State Veterinarian, Salem, Ore.
Hoag, L. Dale, Manson, Iowa.
Jacobson, Olene, Jewell, Iowa.
Jagger, Thomas Henry, 344 8th Ave. W., Vancouver, B. C.
Keown, James Henry, 1100 Pandora St., Victoria, B. C.
Kotlan, Alexander, Michigan State College, East Lansing, Mich.
Myers, Fred Charles, 100 Madison St. Corvallis, Ore.
Patterson, James Eberle, 3800 Grand River Ave., Detroit, Mich.
Peterson, H. D., 214 Clay St., Dallas, Ore.
Redden, C. E., 649 N. Robert St., St. Paul, Minn.
Rivera, Alfonso, Box 136, Hato Rey, Porto Rico.
Rode, Walter F., 400 Exchange Bldg., South St. Paul, Minn.
Stanton, L. E., Box 102, Owatonna, Minn.
Whipple, Frederick Random, 408 No. Adams St., Peoria, Ill.
White, Edward H., Hickory, Pa.
Whitehill, Nelson Hall, 107 2nd St. N. W., Washington, D. C.

COMING VETERINARY MEETINGS

Northwestern Ohio Veterinary Medical Association. Ada, Ohio. July 30, 1925. Dr. F. A. Lambert, Secretary, Columbus, O.

New York City, Veterinary Medical Association of. Academy of Medicine, 17 W. 43rd St., New York, N. Y. Sept. 2, 1925. Dr. C. G. Rohrer, Secretary, 40 W. 61st St., New York, N. Y.

Wabash Valley Veterinary Association. Washington, Ind. Sept. 18, 1925. Dr. M. W. Scott, Secretary, 304 W. 10th St., Vincennes, Ind.

Massachusetts Veterinary Association. American House, Boston, Mass. Sept. 30, 1925. Dr. H. W. Jakeman, Secretary, 44 Bromfield St., Boston, Mass.

Georgia State Veterinary Association. Brunswick, Ga. Sept. 7-8-9, 1925. Dr. Peter F. Bahnsen, Secretary, State Capitol, Atlanta, Ga.

Pennsylvania State Veterinary Medical Association. Williamsport, Pa. Sept. 16-17, 1925. Dr. H. R. Church, B. A. I., Harrisburg, Pa.

Colorado Veterinary Medical Association. Pueblo, Colo. Aug. 11-12, 1925. Dr. A. G. Fisk, Secretary, Pueblo, Colo.

Saginaw Valley Veterinary Medical Association. Saginaw, Mich. Sept. 10, 1925. Dr. W. E. Coomer, Secretary, Bay City, Mich.

Western Michigan Veterinary Medical Association. Grand Rapids, Mich. Sept. 24, 1925. Dr. J. Y. Veenstra, Secretary, 439 La Grave Ave., Grand Rapids, Mich.

THE ADDRESS OF THE PRESIDENT*

By L. A. MERILLAT, *Chicago, Ill.*

While the scope of the president's address is not defined in the constitution, time-honored precedent directs that this occasion be devoted to writing an echelon of events and recommendations into the records. Evidently, it has been the aim to bring the chronological history of the veterinary service of this continent up to date at each annual convention, since a brief of these addresses compiled from the archives of the Association and its progenitor, the United States Veterinary Medical Association, is in fact such a history, and an authentic one, too, because each one was inspired by the problems of its respective hour when the details of passing events were fresh in the mind of the writer.

EULOGY TO THE PAST PRESIDENTS

Besides, the bare facts analyzed and exposed in these presidential reports, now more than three score in number, comprise a great deal of inspiring material for the eulogist. They have been influential in shaping the policies of the veterinary profession in this country and the ruling guide of its progress. Each succeeding incumbent is found to have left deep, indelible prints along the path we have traveled since the Civil War, when a small group of public-spirited practitioners convened in New York to plant the seeds of an appropriate veterinary service for the live stock industry of the American people which, at that time, was already a vast one.

To pay tribute to these far-seeing pioneers who have passed beyond, and to those whose counsels we still enjoy, for this devotion to the cause of animal husbandry and for the strategy and courage it has taken to keep our path unmarred by defeat, in spite of the discouragements they have met, is but feeble recognition of the work they have done for us and for the American people.

In taking my place at the end of this long line of capable leaders, I am frankly alarmed at the responsibilities imposed by the conditions which have crept into our horizon and the danger of misjudging them, convinced that while there is nothing mysterious about the cause, there is grave danger as to the value of any recommendations promulgated at this hour.

*Delivered at the sixty-second annual meeting of the American Veterinary Medical Association, Portland, Oregon, July 21-24, 1925.

Present Situation Difficult to Judge

There is, however, encouragement to be taken from the fortitude of the American veterinarians whose qualifications are not questioned, whose achievements in practice, sanitary science, and research have been the marvel of the veterinary world, who have built up a veterinary service for the people of this continent that has no equal, and who are famous for having surmounted all of the obstacles they have thus far encountered.

The veterinary profession of the United States and Canada is threatened by a gradual decrease in the ranks, especially of those engaged in general practice, and the loss is not due to natural causes only, but to desertions arising from that unprecedented change in the domestic animal situation which no one comprehends better than the members of this audience, none of whom would gainsay that the downfall of the horse has not only destroyed the super-structure, figuratively speaking, but has also severely tested the very foundation of the veterinary service the American veterinarians had built up, leaving them temporarily homeless and groping about for a new orientation.

The Harmful Effect of the Loss of Horse Practice and Its Benefits

Trained intensely in the art of a given specialty which had been the impelling force of veterinary medicine through all of the centuries, the lost prestige stunned the practitioner and left him disabled and ill-prepared to undertake the exploitation of other fields on short notice. The structure planned by Bourgelat and his contemporaries and erected by their successors up to fifteen years ago crumbled beyond immediate redemption in every part of the world where the motor vehicle replaced the horse in large numbers, and while we have "carried on" during the period of readjustment, it is nevertheless true that all practitioners lost morale that has not yet been fully retrieved.

Or, veterinary practice during the past decade might be likened to a great ship marooned after a storm. The main-sail is tattered and the ship drifting, but human resourcefulness and necessity come to the rescue and soon the ship is on its way, tacked with greater efficiency and gradually regaining its former momentum. The crew had learned to unfurl and sail on with the complement of other sails which had been previously neglected. Like the crew of this ship we are sailing on and gaining speed, but we might well be chided rather than pitied, for having failed

in the past to unfurl all of our sails in propelling our occupation.

This eventful period in our annals, like the proverbial ill-wind, has however had its good as well as its bad influences, for if the closing decade goes down in our memoirs as one of discouragement it will also be famous as a period of reconstruction, emblematical of the rebuilding of a burned-down city.

We read more, devote more time to graduate study, attend association meetings in larger numbers, take more interest in professional questions, and we are more profoundly committed to the policy of rendering a truly scientific and more skilful service. Altruism is becoming the guide of our conduct. From a business we have taken over the work of a profession. Preventive hygiene and public health problems are diverting our attention away from the mere notion of salvaging so much horse power.

The whole scheme of preventive medicine—the big idea of lessening the sum total of domestic animal and human diseases—did not perturb those of us who were general practitioners until the storm that took away our main-sail came along to jar us into the realization that other responsibilities were awaiting attention. In short, the mutation actually transformed veterinary practice from the grotesque to the sublime in the eyes of the people, who, deceived by our activities in one direction, did not stop to analyze the full scope of veterinary medicine until we became veterinarians in the true sense of the word. Veterinary practice is rebuilding along new lines, for a regime of ideals that have been lacking in the past, preparing to meet the new situation.

Our Sphere of Usefulness Enlarged

The capital invested in live stock is more vast than ever before; the average value of animals is higher; high-priced animals of all domestic species are more evenly distributed; live stock is more essential to the present system of agriculture; farmers, formerly concerned in the fate of single crops, are now specializing in the breeding of one or more species of farm animals; the need of expert veterinary advice in public health work is acknowledged; the civil and military services of the federal government and of the states are expanding their veterinary branches; the determination to control animal diseases has become a veritable demand of the people; veterinary inspection of every animal slaughtered for human use is a near-future

certainty; and, finally, no thoughtful man underestimates the national significance of the work to which we are devoted. Such is the vast ocean that is open to the veterinarians of this hour.

Scarcity of Practitioners a National Calamity

But, despite the inviting situation, the veterinary profession is not attracting its proper share of recruits. The outstanding misfortune of this moment is the poorly patronized veterinary schools. The rehabilitated ship is not attracting passengers. On the contrary, it is being abandoned. The temptation to embark is lacking. Moreover, it is idle talk to belittle this situation; unwise not to heed and to act upon the cause; sinful to neglect the impending effect, for I can imagine no greater calamity to this country than a scarcity of veterinary practitioners, paradoxical as such an alarming statement may seem to the unthinking mind.

As an agricultural people we can not afford to relax the vigilance of our veterinary service nor leave such a highly specialized occupation fall into the hands of the untrained. The national importance of animal husbandry forbids. Our national security depends more upon animal husbandry than geography, and we, the veterinarians of the United States and Canada here convened, proffer to our respective peoples our devotion to this cause, knowing, as only we can know, the fate of any nation that neglects the control of domestic animal diseases.

Through the instrumentality of their highly disciplined and efficient veterinary services these two countries have won the distinction of being the safest areas on earth for capital invested in live stock. Moreover, the bountiful harvests and the unlimited supply of animal-food products which saved the allied armies during the World War would not have been available if these two veterinary services had not been so resourcefully maintained during times of peace.

It is, therefore, as much a patriotic duty to fill up the veterinary schools as the military academies, independent of the importance of live stock preservation to all other connections: national wealth, abundant food supply, infant mortality, the cost of living, economical transportation and motor power, good clothing, etc.

Numerical Strength Essential to Our Usefulness

But, to keep these services alive and useful, the personnel must be numerically adequate and I know no way whatsoever,

ladies and gentlemen, of accomplishing this than by making veterinary practice an attractive occupation. This, it seems to me, is the paramount issue of the hour, the one problem obstructing our path, the problem this Association must systematically study and, if possible, correct. Let me repeat, veterinary practice is the salvation of the veterinary profession of this country.

There is no lure in the salaried position for the American youngster; he wants a business of his own. The student of pharmacy does not go to school to clerk in a drug store; he visualizes a drug store of his own. The student of law aspires to a large, prominent clientele, but never to a job. The medical student is not thinking of a commission in the army or navy or public health service, but pictures himself performing surgical operations at one thousand dollars each or a waiting-room over-filled with patients clamoring for his services. And, if we are willing to admit the truth, these comparisons apply to the veterinary student, few of whom have ever entered college with the view of working at so much per month. As attractive as these positions are and with the certainty that as many more will be created in the natural course of events, we may be mistaken as to the effect they will have in tempting students into the veterinary college.

The veterinary student of former days thought of the horse then as an invaluable domestic animal, the main-stay of man for commerce, for pleasure, for sport, for individual transportation, for war and for peace. Now, this attraction does not exist and no outstanding temptation has yet replaced it.

Make the New Meaning of the Word "Veterinarian" More Comprehensive

Veterinary practice is still profitable, many practitioners are prosperous and the average income of veterinarians in their various activities is increasing, but to the average man, with the outstanding attraction removed, it is an intangible calling and hence not thought of as a life occupation. To make the changed meaning of the word "veterinarian" more fully comprehensive is the big job of the moment. We are beckoned to make our vocation a definitely understood entity—a tangible thing—by those whom we solicit.

I would recommend that the Committee on Policy be instructed and supplied with funds to study means to that end. The com-

mittee so directed would naturally inquire into the movements which are creeping in to make veterinary practice less attractive. It would seek out means of protecting practitioners against the ill-conceived notion to teach everyone to treat his own animals and which is taking us back to the system of the pioneers, discouraging existing veterinarians and keeping prospective students out of the colleges.

Support the Federal and State Regulatory Services

I admonish my colleagues in practice to give their undivided support to the federal government and to the states in their work of controlling animal diseases; to keep in touch with these movements; to qualify as expert live stock sanitarians; and to offer their services wherever possible. The control of epizootic diseases is a national problem which can be handled effectively only by a single command. The practitioner's role here is to qualify and help, and not obstruct these movements by word or deed on the ill-advised grounds that official veterinarians are intruding upon their prerogatives, when in fact they are doing the reverse and already have brought perquisites which could not have been otherwise acquired. The eradication of tuberculosis, now well under way, for example, has been the most active stimulus we have ever enjoyed and the practitioner himself is the greatest individual beneficiary.

Affiliation with State Associations

Relative to the welfare of the Association itself, which, being national in influence, runs parallel to that of the profession in general, I can not help but recommend again the wisdom of affiliating with the state associations. This question was studied by a special committee, in 1922, and the recommendations made, unequivocally committed to that change, were unanimously adopted by vote of the members in session, but an action of the Executive Board, which I confess I have never been able to understand, stopped all movements in that connection. A reconsideration of the question is in order for the reason that the members who voted for the change are entitled to know how and why their action was overruled.

The New Section on Small Animal Practice

Through the action of the Executive Board, at the annual December meeting, a section on small animal practice was created and will function at this convention for the first time.

Its sessions will be presided over by appointed officers who will be succeeded by officers elected in obedience to the constitution. The innovation of creating a section of this kind was decided upon after mature deliberation over a request made by outstanding specialists in the small animal field. The favorable action was taken on the grounds that there is an ample number of veterinarians in this country, devoting themselves exclusively to small animal practice, to justify the action. It is hoped, however, that this departure is not made a precedent to create sections for each species of domestic animals, for the reason that such a trend would defeat the very purpose of establishing a definite meaning for the word "veterinarian" in the minds of the people.

It is hoped that this new section will be the means of bringing all of the devotees of the pet animals into the membership, and also that its influence will correct some of the violations of professional ethics which have crept into small animal work in some sections of the country. Its work will be watched with a great deal of interest and, I am sure, with profit to the entire profession.

Veterinary Officers' Reserve Corps

The Surgeon General of the Army desires that all eligible veterinarians join the Veterinary Officers' Reserve Corps and thus assist in bringing the present plan of national defense nearer to a state of completion. There is no reason whatsoever why the invitation should not be accepted by a large majority of our members, since it appeals so strongly to the spirit of civic duty, professional loyalty and patriotism. This Association devoted considerable effort, for two generations, to the question of installing a Veterinary Corps in the Army, and to procuring rank and recognition for the Army veterinarians.

As the Veterinary Corps is now a reality and veterinarians are commissioned in grades equivalent to those of the other departments and services, and since we are now invited to fill the positions that we ourselves sought to create, it would seem ill-advised to leave them go begging for occupants. Joining the Reserves, imposing no obligation during times of peace, is urged upon the members of the Association as a debt owed to the nation in view of our time-honored contention relative to the status of the veterinarians of the Army, which has been improved beyond the highest expectations of former years.

Why Practitioners Lack Influence in the Association

There is truth in the prevailing impression among practitioners that the Association is not as directly helpful to them as it should be in view of the fact that they have a majority of the membership. The only way out of the difficulty, if one exists, is for the practitioners to vote at the meetings and at the district "postal card" elections or, better still, change this system of franchise to that of sending delegates from their state associations to represent them.

The most powerful professional association in existence—The American Medical Association—is operated on this plan, as are also all other national associations which have lived and remained useful. Under existing conditions the practitioner need never hope for a properly apportioned representation in the administrative department of the Association, because the same group of practitioners does not attend enough consecutive meetings to keep acquainted with and interested in the problems and politics of the organization, while, on the other hand, another group, composed largely of official veterinarians, attends all of the meetings, takes command, and, naturally, the management of the Association falls to them. They become the so-called clique in spite of themselves, and without them we would likely have no association at all.

Besides, practitioners may be asking this Association to do impossible things for them, to settle family quarrels, for example, which should be attended to locally, while the national association is attending to matters of national import.

The Association is carrying a large surplus in the treasury, each year drawing interest which may be misconstrued as a part of the income of the Association and thus portray a prosperity that does not exist in reality. The veterinarians of today may be crediting themselves with the donations of their predecessors. The actual expenses and earnings for the year should be clearly exposed in the annual reports, to simplify interpretation, and enable the members to vote more intelligently on questions of budget.

I can see no need whatsoever of carrying a large surplus in the treasury that was earned in former years, especially now that it might be expended for much needed constructiove work. The Association should live on its current income and not on its surplus. Any other practice is dangerous and unbusinesslike.

The work of the Women's Auxiliary is commendable in principle as well as in fact. The placing of a part of the Salmon Memorial Fund at their disposal was a worthy act upon the part of this Association. I would highly recommend that more of this kind of promotional work be carried out with our surplus, not only to help worthy students in distress but also to establish scholarships or in any other way build up the student bodies. Constructive work assures the future income, while any other course is only postponing the evil hour.

In behalf of the members and officers I wish to accept this beautiful gavel, presented by the veterinarians of Iowa, in the words of Dr. Bergman, President of the Iowa Veterinary Association, "To replace until found, the gavel presented to the American Veterinary Medical Association by Dr. W. T. Monsarrat, of Honolulu, in 1902," whom I now announce, in sorrow, is listed among the decedents of the near past. The thanks of the Association for this gavel are hereby of record.

I am grateful for the honor of occupying this chair, conceded to be the highest privilege within the gift of my colleagues, and fully conscious of the responsibilities imposed together with the impotence of my efforts without the cooperation of the other officers and members, to all of whom I extend my sincere thanks.

BUREAU TRANSFERS

Dr. Wilbur P. Divelbiss (K. C. V. C. '12), from Jefferson City, Mo., to Lincoln, Nebr., on tuberculosis eradication.

Dr. Frank B. Jones (K. C. V. C. '11), from Jefferson City, Mo., to Harrisburg, Pa., on tuberculosis eradication.

Dr. Cleo L. Lash (K. C. V. C. '16), from Jefferson City, Mo., to Harrisburg, Pa., on tuberculosis eradication.

Dr. H. L. Ragsdale (K. C. V. C. '17), from Jefferson City, Mo., to Harrisburg, Pa., on tuberculosis eradication.

Dr. Jesse E. Peterman, from Jefferson City, Mo., to Raleigh, N. C., on tuberculosis eradication.

Dr. Michael Shipley (T. H. '17), from Albuquerque, N. Mex., to Boise, Idaho, on tuberculosis eradication.

Dr. Louis Metsker (Chi. '14), from Evansville, Ind., to Chicago, Ill., on meat inspection.

Dr. Troy S. Hopkins, from Jackson, Miss., to Chicago, Ill., on meat inspection.

Dr. Thomas V. Col, from Cincinnati, Ohio, to Dayton, Ohio, on meat inspection.

Dr. E. S. Dennison (Ind. '24), from Dayton, Ohio, to Cincinnati, Ohio, on meat inspection.

Dr. Chris D. Lash (K. C. V. C. '10), from St. Louis, Mo., to Des Moines, Iowa, on meat inspection.

Dr. F. P. Miller, from Altoona, Pa., to Kansas City, Kans., on meat inspection.

Dr. Harvey E. Smith (Colo. '18), from Fort Worth, Tex., to Oklahoma City, Okla., on meat inspection.

INSTINCTS IN DOMESTICATED ANIMALS AND THEIR DISEASES*

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The object of this talk to the members of the Pennsylvania State Veterinary Medical Association is not to acquaint you with instincts, for there is no field wherein so much opportunity is afforded for their study as in that of the veterinarian. Nor is the aim to acquaint you with the many laboratory experiments for the elucidation of problems connected with the instincts; for, after all is said, the greatest laboratory for their study is the barn-yard. There the animal wanders in thoroughly familiar surroundings, and consequently the instinctive responses occur in an altogether natural manner. In comparison with this, the laboratory environments are very strange, and the instrumental procedures are particularly potent in interfering with undisturbed instinctive reactions. For these reasons, the laboratory will never entirely supplant barn-yard observations in the study of instincts.

The purpose of this talk is rather to call your attention to the fundamental nature of instincts, based upon information which has thus far accumulated, no matter what the source. Then their abnormalities will be considered, and finally the methods which may be advantageously employed for their control.

First, we will indulge in a few generalities. The living organism has been looked upon as a small world surrounded by a larger one. It apparently exhibits a certain degree of independence; yet most of its activities, indeed maybe all of them, are initiated directly or indirectly by the happenings in the world external to it. Without environment, the living organism would unquestionably be impossible.

The environment not only supplies it with material for activity, growth, and repair, but actually initiates and modifies activity. Those conditions initiating and influencing activity are due to rapid alterations of environmental states, and are known as

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stimuli. They involve a multitude of varieties; and are grouped by most writers into chemical, mechanical, thermal, osmotic, and electrical stimuli. Any of these forms of stimulation, influencing the protoplasm, produce a new sequence of happenings in the organism which collectively is referred to as response. This manifests itself in the form of secretion, muscular activity, and, according to one group of thinkers, conscious processes.

Responses Compound in Nature

These responses are not simple in nature but compound, existing in the form of mechanisms which have special duties to perform in connection with the maintenance of life.

There are two general groups of mechanisms. The first of these are connected with the supply of materials to the body cells, the respiratory, circulatory, digestive, absorptive, and eliminative mechanisms. Other mechanisms belonging to this group regulate the activity of these mechanisms just mentioned. Another offers protection against noxious influences which tend to destroy body cells. Lastly, there are mechanisms connected with the nurture of the offspring whilst in the body.

The second group involves activities of the animal as a whole, being manifested by their behavior. These behavioristic reactions have for their function the obtaining of food, the possession of a mate, and the care of the offspring after birth.

The nervous system is involved in both groups of reactions, in the first of which the reflex is the unit of activity; in the second we have, as the simplest manifestations, the instincts, emotions, and habits.

The reflexes represent the simplest form of physiological activity of the central nervous system. They constitute the physiological units upon which probably, all of the activities of the nervous system are built up. On this account, their nature and principal properties should be first gone into, in brief at least, for their activity in connection with the instincts occupies a predominant rôle.

The static basis of the reflex consists of a receptor structure, effector organ, and a connecting chain of neurones. The receptor structure is a tissue in which the activity is initiated by the stimulus, as represented by the sense organs, for example, the retina or the olfactory areas in the nose. The effector organ is the seat of the activity which has been initiated in the receptor organ and conducted through the chain of nerve cells. The

effector organs are the muscles and the glands. The conception of the simplest reflex involves a receptor tissue, a single effector organ, and two, or at most three, connecting neurones.

This static anatomical conception of the reflex has been referred to as the reflex pattern. Now, when this is active, we develop the dynamic conception of the reflex, and a dynamic unit is thereby established.

It is this unit which is of particular importance to the physiologist, for he is interested primarily, not in structure, but in vital activities. Accordingly, the active nervous system, as seen from this angle, is assumed to consist of a great number of dynamic reflex patterns, each having its particular work to do.

However, the dynamic reflex pattern, as observed in the living organism, is never simple. Many neurones and several effector structures are invariably involved in even the simplest. The conjunctival reflex, manifesting itself by closing of the eyelid when the conjunctiva is stimulated, which is usually regarded as one of the simplest, involves many neurones and several muscles.

Further, the dynamic pattern is not restricted by the structural design. Many reflexes of a diverse character may involve, in part, the same receptors, nerves, or effectors.

Reflex Actions Influence Each Other

Nor is reflex action ever completely isolated. They strongly influence each other, and are strongly influenced by each other, interacting in such a manner that they often work coordinately to the performance of a definite function. Further, reflexes are not only compounded in a coordinated manner simultaneously, but also sequentially, one group of reflexes following another until a given and predetermined end is reached. The act of swallowing involves a marvelous sequence of simple reflexes, wherein the activity of the muscles of the mouth, pharynx, larynx, and esophagus are properly timed to bring about the entrance of the bolus of food into the stomach.

The predetermined ends of these splendidly stereotyped responses have the greatest value to the preservation of life. There is not a mechanism in the body, whether respiratory, circulatory, secretory, or sexual, that is not benignly influenced by these reflexes.

The behavioristic reactions, wherein we have involvement of the organism as a whole, are still more complex, for the reflex

is looked upon as primarily involving only part of the organism.

The simplest form of behavior is the instinct. This bears an intimate relation to the reflex. Indeed, the instinct presents so many points of likeness to the reflex that it may be well to consider the similarities before discussing the differences.

The "dynamic pattern of the instinct" may be looked upon as essentially like that of the reflex, but more complex and involved. This is to be expected, for the functions accomplished by all behavioristic reactions are more difficult to attain and consequently the nervous involvement may be assumed to be greater, including in each act several or many reflexes which are integrated into a new design. In the case of the instincts, it may be stated that the "dynamic pattern" is as stereotyped as that of the reflex. The separate details of response appear with the same constancy, regularity, and approximately the same sequence each time the stimulus is presented. An instinct like the reflex, once initiated, passes in a predetermined manner through various stages to its end.

Instinct Possesses Hereditary Character

The instinct like the reflex possesses a hereditary character. The "dynamic pattern" in both cases is transmitted from generation to generation. If we are to extend the "unit character" conception adopted by students of heredity and apply it to reflexes and instincts, the hereditary transmission may be looked upon as due to the presence in the ovum of each generation "dynamic reflex and instinctive patterns."

Reflexes and instincts are similar in that conscious processes are not of primary importance. In the case of the reflex, it is generally held that it is free of a conscious element. In regard to the instinct, opinions vary. However, there are many who do not believe that consciousness is essential either for the initiation, development, or termination of instinctive reactions. This does not negate the influence of consciousness upon instincts nor its presence during an instinctive act. It is simply assumed that consciousness is not necessary and therefore may be eliminated from our study of instincts, thus freeing the investigator of an element which has in times past produced more confusion than elucidation.

Consciousness, it must be borne in mind, lends itself very poorly to scientific investigation. No quantitative hold can be obtained. In fact, we cannot scientifically establish its existence.

It is impossible, by any scientific procedure, to prove beyond a doubt the presence of a conscious element in any reactions observed in an animal. It is likewise questionable whether any other method of procedure will ever be successful. Indeed, many psychologists, the extreme behaviorists, eliminate a consideration of consciousness entirely from their studies of the behavior of animals, limiting themselves entirely to a consideration of the physiological phenomena involved. This has been aptly referred to as "stimulus-response" psychology.

However, consciousness in some reactions is of the utmost importance, and such methods just referred to have serious shortcomings in the study of the emotions, habits, feelings, and particularly in intelligent behavior where the conscious element is so evident.

Nevertheless, the "stimulus-response" method in the case of the instincts is a particularly valuable method, for consciousness, at least in the simpler instincts, does not seem to be involved at all, and in the more complex forms, does not appear to be of primary importance.

Lack of Purpose

Another point of likeness between reflexes and instincts is the lack of purpose. This term is a very elastic one, and is interpreted differently by different writers. Sometimes it is taken to mean serviceable. In that case, it follows that every reflex has purpose, and the same is true of the instincts. Both forms of reaction subserve functions of the greatest cardinal importance to the maintenance of the life of the animal. When, however, the concept of purpose involves forethought the case is different. The term is then used to mean that the end is clearly anticipated and foreseen. The existence of forethought has been disproved many times in the case of reflexes as well as instincts, if we are to assume that harmful results are purposeless. Instances of this nature are very numerous, some of which will be referred to later. The statement of James, that the instinct is like the reflex in that it is done not to preserve life but because he cannot help it, is still held by the majority of investigators.

Some writers have taken a more philosophical view in their assumption of the existence of the purposive nature of instincts. They hold that the instincts may not always be of benefit to the individual, nor even to the species, indeed in instances may be actually harmful, but are a part of a great plan instituted in

nature which is moving in a definite direction to a given yet unknown end. This metaphysical conception, known as the doctrine of purpose, is impossible of scientific proof.

Having pointed out the similarities between reflexes and instincts, it may be well now to emphasize the differences. In the first place, the "instinct pattern" may be considered to be generally more complex than the "reflex pattern." The complexity of the instinct is not only greater at any given moment but is also of longer duration, involving a longer chain of patterns. Thus, the expulsion of the egg may be looked upon as a reflex. It involves a very short period of time; the brooding instinct, on the other hand, may involve days.

However, a sharp line of division between the two reactions from the standpoint of complexity is quite impossible. There are many reactions which are apparently more complex than reflexes but less so than instincts. Such reactions, as the shaking of water off the body, as when a dog emerges from water; or the rolling of animals in the dust; or again, the huddling of young chicks are difficult to classify on this basis.

Another essential point of difference between reflexes and instincts, often alluded to by writers upon this subject, is that the reflex limits itself to only a part of the animal, whereas the instinct involves the animal as a whole. Thus J. Loeb defines instincts as reactions of the organism as a whole which lead to the nutrition of the individual, the mating of the two sexes, and the care of the offspring.

Mastication a Reflex

Mastication, which is restricted to the jaws, is generally looked upon as a reflex, whereas rooting, searching for prey, the seizing of prey, involving the animal as a whole, are all referred to as instincts.

However, this differentiation between the two is not sharp, and it is difficult convincingly to place many reactions in the proper group. Indeed, writers will be found to place given border-line cases in one category, whilst others place the same cases in the other group. Sucking, for example, is referred to by some as an instinct, by others as a reflex. Similarly, it is difficult convincingly to place properly such reactions as the huddling, the rolling of animals, and the shaking off of water already observed.

As already pointed out, the functional activities of reflexes

and instincts are essentially the same. Both are connected with self-preservation and those maintaining "cohesion of the group whether this group be a clump or a herd of animals" (Rivers), but the tasks accomplished by the instincts are usually much more involved. This is seen in the obtaining of nourishment. The reflex acts manifest themselves only when food comes in contact with the mouth, as observed in the acts of mastication and deglutition. On the other hand, instinctive actions involve the movement of the animal toward the food, which, in turn, is seized, the food-seeking and food-seizing reactions being involved. In this group of food instincts are also included the rooting, goring, stalking, hunting, and diving, in all of which the end accomplished and the mechanism of accomplishment are much more complex than the reflexes connected with digestion.

Reflex Actions Involve Parts of Body

Again, in the case of the protective functions, reflex actions involve only the part of the body to which a harmful stimulus is applied, the part being drawn away; instinctive reaction to the same stimulus involves the movement of the whole animal, as in flight.

Reproduction is represented reflexly by copulation, instinctively by the various intricate mating reactions. The reflex care of the young is limited to the secretion of the milk, whereas the instinctive reactions, such as brooding, nesting, etc., are much more complicated. Finally, the cohesion reactions are represented reflexly by huddling of chicks, a reaction to warmth; on the contrary, the instinctive reactions of this group are many and complex, being referred to usually under the title of herd instincts.

As just seen, the functional tasks accomplished are of the same general nature, although in instinctive behavior more complex and remote stimuli are responded to. Nevertheless, here again, a sharp boundary line is impossible. Some of the food instincts, for example, are hardly more involved than the digestive reflexes.

To summarize, reflex action may be looked upon as generally more primitive, whereas instincts are more highly developed. In the latter, that which is accomplished, as a rule, is more involved and requires more complex machinery for its accomplishment.

In short, the "instinct pattern" is, as a rule, more intricate

than the "reflex pattern." But to repeat, it is always to be borne in mind that a distinct differentiation between the two is impossible. Perhaps the statement of Woodworth approaches the truth in consequence of its very indefiniteness, wherein he states, "there is some difference between the typical reflex and the typical instinct, though it is not very obvious what the difference is."

We may indeed obliterate the boundary line entirely and hold with Pawlow that the instincts are also reflexes but more complex. Reflexes and instincts from this standpoint may be assumed to have essentially the same origin and nature as reflexes, the instincts simply being highly developed reflexes. This retains the study of instincts in the field to which it properly belongs, namely, physiology.

Instinctive behavior is frequently confused with other forms of activity, the most prominent being that involving the feelings, the emotions, and the habits. In all of them, conscious processes are much more manifest and play a more important rôle.

The conceptions of the nature of the emotions are almost as numerous as are the comprehensive writers upon this subject. In the confusion which obtains in the present-day accounts, it may be justifiable to assume that the emotions are still more complex than instincts and including reflexes and a positive and distinctive conscious element which is different in each emotion. For example, the emotion of fear involves many reflexes controlling the circulatory, respiratory, secretory, and muscular system. It also includes such instincts as flight. Finally, it involves definite and distinctive psychic activity. Functional activity of the emotions, nevertheless, is like the reflexes and instincts, being connected with self and race preservation.

Difficult to Differentiate Instincts from Habits

Much more difficult is it to differentiate the instincts from the habits. Habits, used in their behavioristic sense, have been referred to as a complex system of reflexes which function in serial order when the organism is confronted with certain stimuli. In this regard, they are like both complex reflexes as well as instincts, but differ in that the habit is acquired in the life of the individual and are supposed not to be transmitted to the offspring. The "habit pattern" therefore differs from that of the instinct in one great essential—new paths are developed after birth.

However, not knowing the development of the particular activity, it is difficult to state whether it belongs to the group of habits or instincts. In fact, many are confused, the tendency being to refer to many well-known habits as instincts. The singing of birds, usually referred to as an instinct, recent investigation classes as a habit being learned from the older birds of the same group. Even mousing may be a habit rather than an instinct, being developed by imitation of older animals. Experimental proof of this is, as yet, not conclusive.

As already pointed out, the great functions of the instincts are three, namely, preservation of the individual, continuance of the species, and cohesion of the group. This form of behavior in association with the tropisms and reflexes has been efficient enough to maintain the multitudinous species which are at present existent upon the face of the earth. In the lowest forms, the tropisms suffice to maintain life, using that term, which has been given such varied meanings, as involving the reactions occurring in animals independent of the activities of the nervous system. When the nervous system begins to functionate, reflexes are added. Still further development of the nervous system is associated with the occurrence of instincts. These become more and more important, and in the higher organisms they become essential. Without proper instincts, life of all higher forms would soon disappear.

Instincts Highly Efficient

Considered from the standpoint of efficiency, instincts reach a very high degree. Some of them pass through most complex stages of activity of considerable duration with a splendid harmony and coordination that is really marvelous. In fact, some of the more intricate of the instinctive reactions simulate intelligent behavior to almost a convincing degree. Every observer knows of instances of this kind. For example, there is a hornbill in Southwest India which lays two eggs in the hollow of a tree. When incubation begins, the male plasters up the entrance with clay, leaving a narrow slit only, through which he feeds his imprisoned mate. Even more marvelous are some of the instinctive manifestations of bees and ants.

Many instances of this character have awakened so much admiration that it has led to the conviction that instincts have reached perfection of efficiency. This particularly applies to the laity, and frequently we hear among them the comment, which has become a fixed belief, that one can trust the instincts.

Yet when we critically study the instincts from the standpoint of efficiency, we find them on several counts far from being perfect.

In the first place, they do not reach maximum efficiency at the moment of their appearance, but pass through a period of imperfect reactions before reaching their maximum functional capacity. The period is, however, usually short in duration and of little consequence.

Secondly, the instinct may remain poorly developed, the same instinct reaching varying degrees of efficiency in different animals. The nesting instinct, for example, is not developed to an equal degree. In different birds it varies from that of the building of a very poorly constructed nest to one that is architecturally superb. Yet there is no obvious reason why, by employing a part of their idle time in nest building of a high order, this would not be of greater advantage to all species of birds.

Nesting Instinct Usually Absent in Mammals

Among mammals, we find this instinct generally absent. A crude nest is built by the pig. There is a striking exception in the beaver. Their nest is as marvelous as that built by the highest order of nest-building birds.

In the third place, a very serious shortcoming of instinct is their stereotyped nature, in that they invariably react to a given stimuli in a similar manner. In consequence of this, there is lack of adaptation to new external conditions. Such instincts which, under the usual environmental conditions, are of a great advantage, may continue, although useless in the new surroundings of domestication. As an illustration of this kind may be mentioned the instinct observed in dogs, of turning around a couple of times in one spot before lying down. This was perhaps an advantageous preparation in the wild state. As usually explained, it is assumed that the ancestor, living in tall grass, in this manner packed the grass before lying down. This instinctive act is still persistent in domestication, even though a flat surface is the place which the animal selects to sleep.

Sometimes these persistent instincts may actually operate for harm rather than for benefit in domestication. Particularly annoying to man are the offensive instincts observed in the carnivorous animals. The killing instinct is one illustration of this kind and, although usually disadvantageous, it is not always so. This will be discussed later.

A fourth evidence of imperfection is found in the fact that several different kinds of stimuli may awaken a given instinctive reaction. The stimuli, in short, are frequently not specific enough. This is particularly seen in domestication. The maternal instinct in the hen is awakened as readily by newly-hatched ducklings or turkeys as by chickens. This may not be harmful, but it is not, at least, to the advantage of the offspring of the chicken. Sometimes harmful results occur, as when the catbird deposits her eggs in the nest of another and smaller bird, which, on account of the activity of the maternal instinct, feeds the strong offspring until utterly exhausted, and her own fledglings die of starvation. The mother may even be consumed by the foster offspring when they become larger and stronger than she.

Mothers Nurse Offspring of Other Animals

This reaction is also seen in the mammals. Mothers are often found who will nurse the offspring of other animals when their own have been removed. In some cases, the animals suckled may be deadly enemies. Among the many recorded cases of this kind is one of a wolfhound bitch whose puppies died and who subsequently suckled little pigs. The bitch has been known to suckle lion cubs. Innumerable authenticated instances of this kind are known. In fact, the removal of milk from the milch animal by the human milker is only possible as a result of the absence of specificity of the stimulus, the human hand being as effective, or almost so, as the mouth of the offspring.

This lack of specificity of stimuli is also seen in the food-selecting instinct. Instances of harmful results following the consumption of improper food by domesticated animals continually confront the veterinarian. Space permits reference to a few instances only. When cows were first introduced into certain regions of Africa, they consumed strange plants which produced their death. Indeed very many died. Likewise the eating of harmful weeds, sheepbane and many others, produces poisoning which frequently requires treatment. The eating of wet clover leads to hoven. The eating of diseased food leads to the numerous parasitic and other infectious diseases. The devouring of live bugs by ducks, it is said, is followed in some instances by perforation of the alimentary canal, brought about by activities of the consumed animals.

The food-selection instinct in all these instances gives the

animal little protection against the harmful stimuli. Indeed, the veterinarian places little confidence in its efficiency, in spite of the fact that this has been efficient enough in past times, in the aggregate, to maintain life from generation to generation.

In spite of such evidence as has just been referred to, the statement is frequently made that the animal will invariably select the proper food and avoid that which is harmful. "Let the animal eat anything that instinct dictates." This we frequently hear, even among otherwise intelligent individuals.

From the standpoint of efficiency, not even the reflexes are to be relied upon. Thus, swallowing is attempted when food is in pieces that are too large and may become impacted in the esophagus. This sometimes happens to the after-birth.

Foreign Bodies Cause Trouble

Undigestible substances are also frequently swallowed. Hardware and other materials of a like nature are often found in the reticulum of cattle. Death not infrequently follows from perforation. Here the food-selecting instinct, as well as the swallowing reflex, is at fault.

The fifth imperfection of instinctive behavior is observed when a given stimulus may produce a different instinctive response, depending upon the physiological conditions present in the body. Hunger, rutting, thirst, pain, and many other conditions influence instinctive response to a given stimulus. At times, these reactions may be a source of danger. The writer once had a bird under observation during the nesting period. Material for the nest was scarce. However, a wooly dog was available and became a source of supply, the bird lighting upon the back and pulling out small clumps of hair. Here the response of the nesting instinct was more sensitive than the defense instinct. This, indeed, was a dangerous procedure, and may have led to the destruction of the bird. Reactions of a like nature, wherein a harmful rather than a useful reaction to a given stimulus occurs, are frequently observed.

We will now pass from the imperfections of instincts to definite abnormalities, which may be looked upon, as we do in the case of abnormalities of body structures, as diseases. These abnormalities, so numerous and varied, may be classified into four groups. The first group includes those in which the degree of development varies from the normal, being either excessive or deficient. The second class consists of those which are active

at the wrong time in the life cycle, appearing too early or persisting beyond the usual time of disappearance. The third group constitutes those which react to different stimuli than is normally the case, in other words, they are awakened by abnormal stimuli. Finally, there is a variety which presents a different dynamic design from that normally seen. The last group may be referred to as perverted instincts. We will consider these groups in the order just given.

Normally, the degree of intensity of instinctive reaction varies considerably within the boundary lines of efficiency, but when the variations go beyond this point, and they become either practically useless or actually harmful, they then may be looked upon as abnormal. At the one extreme, one may observe a complete absence, comparable to what is found in the field of morphology, where we may have, for example, an entire absence of pigment, as seen in the albino. At the other extreme, we observe excessive development, corresponding to melanism in the case of pigmentation. This excessive activity may produce harm to the individual or even to all others around.

These variations are not at all uncommon, and involve all of the classes of instincts. We will consider somewhat in detail the three cardinal groups, sexual, defensive, and offensive.

Sexual Instinct May Be Poorly Developed

The sexual instincts may be so poorly developed that such reactions as copulation may be very infrequently or not at all performed. Such instances are quite rare but do occur. On the other hand, abnormally high development seems to be very prevalent in our domesticated animals, being much greater than in the wild ancestors. The maternal instinct is occasionally observed to be deficient or even apparently absent in domesticated mammalian mothers. All animal breeders of wide experience have seen mothers desert their young at a time when, without their care, the offsprings were doomed to death.

Among birds, the brooding and the care-of-the-young instinct are frequently absent in domesticated fowls. Nor do the various reproductive instincts undergo abnormal alterations of equal intensity, for one may be absent and the others remain. Certain breeds of chicken show an absence or great deficiency of the brooding, yet the egg-laying instinct may be very well developed, in fact increased.

The defensive instinct, as a rule, is greater in the more helpless

of animals, being more readily obtained in herbivora than carnivora. Nevertheless, it may be stated, that the defensive instinct is great in all animals, but varies as to the nature of the stimulus. When, however, new stimuli are presented which may be really dangerous, an animal may not respond with defensive reactions. Man, the most dangerous of all animals, to a species not before in contact with him, may not at first bring about defensive reactions, which, in turn, may deplete the species. Many instances of this kind are known. This nonresponsivity to dangerous stimuli of a new order is again an illustration of inadequacy of instinctive response.

Combative Instinct Varies Greatly

The combative instinct varies greatly in our different domesticated animals. It is better developed, comparatively, in the carnivora than in the herbivora, the reverse from that observed in the intensity of reactions of the defensive instinct.

It may also be stated that this instinct is much more developed in some breeds than others of the same species. For example, in the game-cock it is of very high development, exceeding in this regard any other breeds.

Sex, too, is said to have an influence on the development of this instinct. The males of all species are held to have the offensive instinct developed to a greater degree, at least, as measured by the ease of elicitation and vigor of response. Further, the offensive instincts are unquestionably more highly developed in some males than in others, one being more game, as the fancier states, than another. When combined with a powerful muscular development, these reactions of an animal often succeed in the control of the females of the herd. For this reason, an apparently high development is often pointed out as a mark of masculinity. However, the offensive instinct also becomes very highly active in the female at times, as when the defense of the young is necessary, equalling in intensity, as measured by exposure to danger, that of the most vicious male.

Of the offensive instincts, that of killing shows the greatest variations. It is absent for the most part in herbivora, except among the males of some of the species during their fights of defense or of sexual control and among the females in the defense of their young. On the contrary, it is highly developed among carnivora. This is to be expected, as these animals subsist in the wild state, for the most part, upon living game,

the reaction being a food-obtaining instinct. This persists in domestication. But it may be remarked that these animals in the wild state exercise the killing instinct, generally at least, purely as a reaction to hunger, the destruction being more or or less limited to the amount of food consumed. There are some exceptions, like that of the weasel.

In domesticated carnivora, this killing instinct, at least in the presence of sufficient food, is infrequently exercised. But exceptionally this instinct exists in a very high degree of development in certain animals, as for example, in the mouser and ratter. Dogs and cats and ferrets of this class kill mice and rats in great numbers, far beyond the food requirements, indeed, in dogs, the prey is usually not eaten at all. The instinct here, although distinctly advantageous to the human being, is decidedly abnormal and therefore has a dangerous phase. Sometimes this instinct goes beyond the destruction of small animals, larger, helpless animals, like sheep, are wantonly destroyed. Sheep-killing dogs are so common that laws have been enacted to protect the sheep-raiser against this abnormal development of an instinct, wherein destruction is the chief end rather than food consumption.

It would be of the greatest value to be able to measure the degree of efficiency of the various instincts in the individual animal. It is quite as important to know the instinctive behavior as the functional capability in the selection of a domesticated animal.

It may be assumed that when the instinct is well developed, the effector organs are likewise capable of great functional activity. There is indeed such a relation, but it is only a very rough one. The walking instinct, for instance, does not develop until the skeletal muscular system and the controlling nervous system have reached a certain degree of development. The same is true of the sexual instincts. At puberty, the structural basis for reproduction as well as the sexual instincts are equally well developed. Both develop at about the same time. The animal is not only anatomically but also instinctively developed early.

But this has only general significance, for when we study the problem in detail, we find that the size of a given effector does not give us a reliable quantitative hold upon the degree of development of the instinct. Large horns do not necessarily indicate high development of combative instinct; long, slender

extremities and body, that of the defensive instinct of flight; large genitals, that of sexual instinct.

The snout of the pig may be well developed, yet the rooting instinct no more developed than in another type in which the snout is abnormally short. The types with short snouts are not, on this account, less addicted to the rooting instinct under proper conditions.

Again, a powerful animal with greatly developed fighting weapons may not be a good fighter. This is seen in domestic fowl. The game-cock cannot compare in size and strength with that of the meat breeds, yet is easily superior in the combative instincts.

It should be borne in mind that the effectors are only a part of the instinct. As has been well stated, "the carnivore does not prey on animals because he has large teeth, his food-seeking instinct has become specialized in this direction." (McDougal)

Each Instinct Has Definite Life History

Another modification of instinctive behavior is to be found in the time of appearance and duration of existence in the life cycle of the animal. This signifies that each instinct has a definite life history within the longer life of the individual, that is, a definite time of appearance, time of reaching maximum efficiency, period of maintenance of maximum activity, time of decadence, and in some instances, time of disappearance. Marked differences are observed in this regard when the different instincts are considered. Some are fully developed before birth, having made their appearance in fetal life, others do not make their appearance until maturity. All undergo decadence in extreme old age, some disappear during the life of the individual, others disappear only with death. For example, the sucking instinct reaches the capacity for a high degree of functional activity considerably before birth; the sexual instincts, on the other hand, not reaching efficiency until puberty.

However, the life histories of the various instincts are not the same in all species of animals. These variations, in a large measure, are due to the differences in the duration of the life cycle. But they are also influenced by the variations of time at which post-natal life begins. In some, the extrusion of the offspring occurs at earlier stages of development than in others, using degree of development as a basis of age computations. In short, some animals are born older than others. Those born

when very immature develop the instincts later, and vice versa, provided the life cycle is roughly the same. This explains a difference in the time of the appearance of the walking instinct in such animals as, for instance, the guinea pig and rat. The guinea pig—a rodent, the development of which is quite advanced at birth—starts to walk as soon as born; the rat, on the other hand—another rodent, which is very immature at birth—does not walk for some days.

Variations in the life history of the instincts also is associated with the rapidity of structural development in the post-natal life of the animal. In those forms where maturity is rapidly reached, the sexual instincts make their appearance early, and vice versa.

Activity Directly Related to Needs

Another remarkable property of instincts, sometimes subject to abnormalities, is that their cycle of activity bears a direct relation to the needs of the organism. As a general rule, it may be stated that they do not reach maximum efficiency until needed. Thus, those connected with the obtaining of food develop early, the very first instinct to appear being that of sucking. Those connected with shelter develop somewhat later, sometimes only after the period of maternal care has passed. The combative instinct reaches maximum efficiency only in adult life. Likewise, the sexual instincts become efficient when paternal care is possible.

Further, the instincts undergo decadence and disappear when no longer of value to the organism. The sucking instinct is one of the first to disappear, being no longer necessary when the animal begins to feed upon material obtained from the environments. Similarly, the sexual instinct undergoes decadence when the parent is too feeble, on account of old age, to care properly for the young.

As a concluding generality, it may be stated that the instinct is present when most needed, but in a low degree of activity or absent when not required.

In accordance with this, we find that some instincts appear and disappear several times in the life of the host, depending upon the requirements of the organism. Those connected with the care of the young belong to this group. An excellent instance is the brooding instinct observed in birds. From time to time this appears in the egg-laying stage of the hen's life, to disappear

in a few days if the proper conditions for its development are not present.

The same is true of the grasping-of-the-young instinct, wherein the mother carries them from place to place, away from danger. As the offspring become larger and stronger and better able to care for themselves, the efforts of the mother disappear, to reappear with all their vigor at the birth of the next litter.

The great advantage which accrues to the animal as a result of the proper timing of the appearance and duration of the instincts is obvious. This had its origin in ancestral forms. Those animals in which the instincts appeared and reached efficiency, and maintained it at the proper time of the life cycle, lived longer and produced more offspring and became increasingly more numerous. Those in which the instincts were not properly timed suffered from this defect, and were replaced by the former group.

Evidently, abnormalities affecting the order of appearance and duration of efficiency of instincts often act counter to the advantage of the animal, sometimes to a serious degree. When the sexual instincts develop too early, the offspring so taxes the body strength of the youthful mother as to produce distinct harm. On the other hand, the sexual maturity may develop too late and valuable time is lost, reducing the number of offspring possible.

Again, the combative instinct may appear too early, and those of the litter in which this occurs may injure the others and interfere with their proper development.

Well-known abnormalities of the character above described are numerous. To mention a single instance, that of the maintenance of the sucking instinct, long after the normal nursing period, is of frequent occurrence. It may persist to adult life, and is not infrequently seen in cattle.

Perversions of the Food-Selecting Instinct

The next group of abnormalities of the instincts belongs to the class of the so-called perversions. The instinct is either awakened by unusual (abnormal) stimuli or manifests an unusual course. The most frequent cases observed by the veterinarian are those involving the perversions of the food-selecting instinct, wherein very abnormal substances are consumed.

Among the totally non-nutritious materials ingested are feces, plaster, abnormal inorganic salts, pebbles, metallic substances,

such as jewelry, hardware, etc. One of the above, namely, pebbles, is normally consumed by birds, and this possesses distinct functional value; but such is not the case in mammals. Cattle are particularly addicted to the swallowing of metallic substances, and the veterinarian often finds, on postmortem, the reticulum filled with most unusual articles which may have produced death by perforation. For this reason, the reticulum has been referred to as the "hardware curiosity shop."

In other perversions of this class, abnormal nutritious materials act as stimuli. The most common manifestation is the consumption of other individuals of the same species. The most dangerous of these perversions is cannibalism. In the lower animal forms, cannibalism is very common, prevalent enough to be considered normal. It becomes rare, however, in the higher forms. Yet it is not infrequently observed in poultry when one of the flock is wounded, the exposed raw flesh acting as a stimulus. It is also seen in mammals, particularly in the form of the eating of the offspring, although here, too, wounded animals may be killed and eaten, as observed in wolves.

There is one phase of cannibalism which remains in all mammals and may be considered normal, namely, the eating of the after-birth. It is observed even by strictly herbivorous forms. This has obvious advantages, for if the placenta would remain in the lair, putrefaction would set in, which, in turn, would be a source of infection tending materially to reduce the population.

One wonders, when the lack of anticipation of instincts is taken into consideration, why the animal stops at the placenta and does not eat the offspring entirely. It is believed that this occurs comparatively seldom in the wild state. When, however, wild animals are confined, the eating of the offspring is very common. The explanation is difficult to find, for this occurs even when they are plentifully supplied with food. May it not be surmised that occasionally this may be due to fear of the capture of the offspring, in consequence of the fact that the mother cannot secrete them in a safe place, as she would do in the wild state?

Self-Sucking a Perversion of Instinct

Another perversion belonging to this class is the self-sucking instinct observed in some milch animals. The veterinarian has devised mechanical means to overcome this. Among birds, too, abnormalities are frequently observed—the feather-eating and

the egg-eating instincts. The feather-eating instinct occurs particularly when confinement of large flocks is too great. Much is to be learned as to its origin.

The egg-eating instinct is very common in chickens. The origin is also unknown. Sometimes this may arise in the accidental breaking of an egg, and the practice develops in the flock by imitation. If this be really the explanation, then the egg-eating habit is not a perverted instinctive reaction but a habit. Indeed, all the perversions of this class may be looked upon as habits.

Abnormal stimuli are also sources of perversions of the sexual as of other forms of instinctive behavior; animals of the same sex may excite sexual reactions. Attempts at copulation with other animals of the same sex is not at all uncommon in domesticated animals.

The sexual perversions frequently manifest themselves in a change in the reflex pattern. The act of copulation may be perverted into forms of masturbation.

We now reach the goal of the student of the instincts, namely, their control.

The great practical purpose of science is to control the phenomenal world, to put it in chains, as it were, to modify and alter it so as to be a benefit to humanity. Likewise, the practical aim of the scientific study of the instincts is to learn how they may be controlled and modified in the domesticated animals to render these animals of greater service to the human family. For, after all, domestication is an institution having for its purpose benefit to human happiness, convenience, and nurture.

Jungle Instincts Incompatible with Domestication

Many of the primitive instincts, sometimes referred to as jungle instincts, are incompatible with the conditions extant in the environments of domestication. They sometimes render the animals useless, at other times they defeat efforts at successful domestication. These are advantageously modified or entirely eliminated. Others, on the contrary, are not only necessary but also advantageous, and, if developed to even a higher degree, would increase the value of the domesticated animal. And finally, the perversions and abnormalities of the instincts which were seen to become so frequent in domestication also need supervision.

To cite specific instances, some of the wants are these: increase

of egg-laying instinct, decrease or sometimes increase of brooding instinct, increase or sometimes decrease of parental instinct, decrease or increase of the offensive instincts, decrease or increase of the defensive instincts, dimunition or increase of the killing instinct, earlier or later development of sexual instincts, and many others. Our problem then is: How can this be done and to what extent?

The method of attack is to control the various conditions which modify instinctive behavior as far as possible. By making proper changes in these conditions, the reactions may be directed, to some extent at least, toward the desired ends.

The most important of the conditions are hereditary transmission, endocrine activity, the nature of the food, the exercise of the instincts, and the establishment of habits.

Heredity Comes First

First and foremost is heredity. Both temporal and intensity variations of the instincts are deeply rooted in heredity. The instincts of the offspring, like the structural characters, are roughly like those of the ancestor. It is apparently just as possible for the organism to transmit dynamic as structural characters. Simple instincts seem to possess the properties of a "unit character," as already pointed out. It follows that if an instinct is poorly developed in the hereditary line of animals selected for breeding, the offspring will eventually tend to show the same characteristic. This enables the breeder to eliminate an unfavorable instinct. On the other hand, by proper selection he may accentuate the activity of a favorable instinct. Success along this line has been obtained in several instances. Among the accomplishments attained may be mentioned the "breeding out" of the brooding instinct in some of the types of fowl. This instinct inhibits egg production, and the advantage of its absence is that the duration of the egg-laying period is lengthened and the total egg output is supposed to be thereby increased.

The results along these lines, wherein the efficiency of our domesticated animals has been increased, are positive, and more is undoubtedly possible. A field rich in reward is presented to the investigator. All that is necessary is that the breeder pay as much attention to the heredity of instincts as he has in the past to morphological character.

In order of importance in influencing the instincts, the second place probably belongs to the internal secretions. They are

particularly potent in the life history of the animal. The endocrine glands produce these highly active substances. The administration, as well as removal, of certain of the glands markedly modifies instinctive behavior. All of them perhaps have some effect, either directly or indirectly. Some exert only a slight influence. Others produce very wide-reaching effects.

The most potent of the endocrine structures are the medulla and cortex of the suprarenals, gonads, thyroids, and pituitary.

The thyroid unquestionably contributes to normal instinctive behavior. The importance is seen in cases of hypofunction. This is associated with a retardation of development and reduction in the intensity of the sexual instincts.

The pituitary likewise plays an important rôle. When this organ is deficient in function, there is an associated change in the instincts, as in the case of the thyroid, the most marked change being a reduced activity of the sexual instincts.

The cortex of the suprarenal glands seems to be connected with the reproductive instincts also. Hyperfunction apparently produces sexual precocity.

The medulla of this organ produces a secretion which, according to one theory, substantiated by considerable evidence, intensifies and prolongs response of the offensive and defensive instincts.

The pineal gland has also been referred to as potent in affecting instincts, but this is still in doubt. The action of the thymus is also doubtful.

The Effects of Castration

None of the endocrine glands influences the instincts as much as the gonads. The effects of hypoactivity and of hyperactivity are quite positive and well known. Castration produces profound effects. Not only are the sexual instincts reduced to almost nil, but the offensive instinct is less developed. The animal consequently becomes less vicious. Similar changes are also noted in the female when the ovaries are removed in early life.

It may be interesting to note that the reproductive instincts are not entirely wanting in animals after the gonads are removed. In fowls, the brooding instinct, as well as the parental instinct, may be observed after caponization. Such capons have been actually found useful for this purpose, setting on a larger number of eggs than the hen, and in some instances are just as efficient as the mother in the caring for the young chicks. Some poultry raisers actually believe them to be more efficient.

The above observations clearly indicate that the brooding and parental instincts are not dependent upon the female sexual organs. Therefore they are not exclusively female instincts. It has been assumed that the testicles produce a substance which inhibits these instincts, a property not possessed by the ovarian internal secretion.

This brief survey shows the positive influence of the endocrines upon the instincts. This suggests that the day will come when, by controlling the activity of these glands, the instincts may be modified, somewhat at least, according to the desires of the breeder. The possible methods are three: first, ablation, which has already been successful in one case; secondly, the injection of extracts which, as yet, has not, but may eventually, give positive and valuable results; and thirdly, that of transplantation. How far these methods will be successful remains for the future to decide.

The Experiments of Steinach

The experiments of Steinach on rats are interesting in this connection. This investigator was successful in feminizing males. The method consisted in removing the testicles of the animal and subsequently transplanting ovaries from another animal of the same species. These "feminized males," according to this investigator, exhibited not only the guarding instinct, but during heat accepted the male and manifested the tail-erect reflex which is normally seen in the female at the time of copulation. On the contrary, "masculinized females," produced by removing the ovaries of the female and transplanting the testicles of the male, perform the act of copulation like the male. The most serious shortcoming of the transplant method is the short duration of the transplant in the new host.

Food, external temperature, and exercise also modify the intensity of the instincts, as well as their time of appearance and disappearance. This probably, in some way not yet understood, is the basis for the profound changes which occur in the instinctive life of animals placed in confinement and domestication.

Many instincts are modified by domestication. The offensive instinct has been greatly reduced. Every one has observed the gentle disposition of the dog, that is, the absence of offensive instinct even when the victim of almost cruel treatment. How different from the wolf, coyote, and jackal—the wild ancestors!

The sexual instinct is also profoundly changed in the domesticated animal. Those which in the wild state normally rut only once a year, may rut two or more times in the same period, and each time the sexual instincts manifest themselves with a high degree of intensity.

The acuity of the food-seeking instinct may also be reduced. When the food supply in domestication is difficult to obtain, some animals suffer considerably more than others. Thus, some types of cattle can live better under conditions of poor food supply than others. They are referred to as better rustlers. These breeds will obtain the maintenance requirement when others will lose much flesh and show evidence of starvation.

The other instincts, like the defensive, are also more or less profoundly affected by domestication.

It has always been a question as to how domestication brings about these profound changes. Of the changed environmental conditions involved in the explanation, the most important seem to be the changed food supply. Other conditions exerting a minor influence are the absence of prolonged exposure to extreme temperature, and the absence of fear stimuli.

Food Supply Influences Instincts

Food, in domestication, is not only usually abundant, but is also easily obtained by the animal. Often, too, the diet varies in nature and physical state from the diet of the wild ancestor. Unquestionably this influences the food-seeking instincts. In domestication, therefore, they rarely reach maximum efficiency. These reactions are normally obtained only in the hungry animal. They are inhibited by the absorbed food-products in a manner as yet unknown. In domestication, therefore, food-seeking instincts rarely reach maximum acuity, for food is seldom scarce. They are infrequently exercised, and are therefore found to be poorly developed. As an instance, the rooting instinct observed in pigs may be held in abeyance by giving the animal sufficient food. The cannibalistic instincts may, in a measure, be cleared up in the same manner. It follows that domesticated animals exposed to great food scarcity, wherein food was also difficult to obtain, would probably not be so successful as the wild ancestor under similar conditions.

Food supply influences the offensive instinct. Starvation is associated with manifestations of anger on the slightest provoca-

tion. The hungry animal, if a powerful one, is likely to be dangerous.

Food also affects sexual reactions. Starvation, or even partial starvation, will markedly reduce reproductive reactions. The chicken lays fewer eggs. The mammal is also affected, the food-seeking replacing the mate-seeking instinct.

On the other hand, excess of food seems to stimulate the reproductive reactions, the hen lays more eggs, the mammal may rut more frequently. At least this may be looked upon as being one of the factors explaining the shortening of the intervals of rutting.

Food being one of the conditions influencing the instincts, it may be used in controlling them to some extent. This is utilized in correcting the abnormalities and perversions.

The restriction of exercise, which is the rule in domestication in the case of cattle, sheep, pigs, and goats, is supposed also to influence the instinctive behavior. Less exercise permits more energy, it may be assumed, for the reproductive instincts. Lack of exercise may also be a factor in the development of perversions of instincts. Increase of range and its attendant exercise may at times eliminate the cannibalistic instinct.

The freedom from fear stimuli in domestication may also exert an influence on instinctive behavior. In the wild state, the constant exposure to enemies of various kinds is unquestionably favorable to the exercise of the offensive and defensive instincts which, in turn, inhibit the reproductive. In domestication, these reactions are less frequently brought into play, more time being available for the reproductive activities.

The Effect of Use and Disuse

Another factor influencing the instincts is that of use and disuse. There is a physiological law which states that the functional capacity of a structure increases with activity within certain limits. Contrariwise, functional capacity reduces with disuse. A muscle hypertrophies if exercised properly, and atrophies if kept too long at rest. The same would seem to apply to instincts. That disuse is associated with reduction of reactivity is believed by many trustworthy writers. Darwin calls attention to an assertion made by Hippocrates and again by Harvey that a young animal forgets in a few days the art of sucking and cannot without some difficulty again acquire it.

On the other hand, instincts, as the result of frequent use,

often improve in rapidity of development, intensity of duration, and accuracy of movement. By persistent repetitions they are rendered more efficient for the purpose intended. For instance, the offensive instinct may be improved in the game-cock by proper training.

Instincts are also strongly influenced by experience. In other words, the effect produced by an instinctive response influences, to some degree, behavior of a similar kind on subsequent occasions. An instinctive activity that has been agreeable is associated with repetitions of the instinct when the proper stimuli are applied. When the effect is disagreeable, there is often inhibition of subsequent instinctive reactions of that particular kind. A wild animal, caught when seizing bait in a trap, will, if he makes his escape, inhibit the food-seeking instinct when food is again presented in that trap. The above fact is utilized in the training of animals.

Pawlow's Latest Experiment

The methods thus far mentioned accomplish much in molding the instinctive behavior of an animal, but still much is to be desired. Indeed, it would be of the greatest benefit if it were possible to impart heritable characters to habits, in short, to form new instincts. This at once leads us to one of the greatest problems in the biological sciences, the transmission of acquired characters, namely, as to whether acquired characters, that is, those developed in the life of the individual, may by any means become hereditary and consequently transmitted to the offspring. Most of the present-day investigators have taken the negative attitude, believing the data offered in its behalf to be inconclusive. However, within the last year, Pawlow has presented some experiments which seem significant, and if eventually properly substantiated, would give to us our first evidence of transmission of acquired activites. Pawlow made his observations on conditioned reflexes. These are reflexes in which new afferent paths have been developed in contrast to unconditioned reflexes which are heritable and stereotyped. The origin of the conditioned reflex is in experience, therefore develops in the life history of the animal. Pawlow studied the transmission of conditioned reflexes in the following manner, quoting his own words: "Conditioned reflexes to electric bells are formed, so that the animals are trained to run to their feeding place on the ringing of the bell. The following results have been obtained: The

first generation of white mice required 300 lessons. Three hundred times was it necessary to combine the feeding of the mice with the ringing of the bell, in order to accustom them to run to the feeding place on hearing the bell ring. The second generation required, for the same result, only 100 lessons. The third generation learned to do it after 30 lessons. The fourth generation required only 10 lessons. The last generation which I saw before leaving Petrograd, learned the lesson after 5 repetitions. The sixth generation will be tested after my return. I think it very probable that after some time, a new generation of mice will run to the feeding place on hearing the bell, with no previous lesson."*

NEWS ITEMS

Anthrax recently made its appearance in Perry County, Missouri, according to press reports.

Another report is to the effect that three men became infected with anthrax, while skinning cattle, near Perryville, Mo.

A quarantine has been placed on the ferry between Chester, Illinois, and Ste. Genevieve, Missouri, by the state veterinarian of Illinois, to prevent the introduction of anthrax into Illinois from Perry County, Missouri.

The Buffalo Evening News runs a little boxed article every day, "Stolen Automobiles." Nobody ever accorded that much honor to old Dobbin in the horse-stealing days.

Striking two high tension wires with its wings, a crow in Pennsylvania is reported to have caused a short circuit that electrocuted two cows and interrupted telephone communication. The item does not say what the two cows were talking about over the phone.

According to a report from Eau Claire, Wis., investigation of the mystery surrounding the finding of hundreds of dead fish along the shores of Half Moon Lake has revealed the white down from cottonwood trees to be responsible. It is believed the fish struck at the fluffy down falling to the water's surface, believing it to be insects, and that the down caught in their gills, interfered with their breathing and suffocated them.

*Science, lviii (1923), pp. 359—360.

LIVE STOCK IMPORTATION IN THE PHILIPPINE ISLANDS

By VICTOR BUENCAMINO, *Manila, P. I.*

Recently there has been considerable discussion as to the advisability of prohibiting the importation of live stock from foreign countries, on the supposed basis of its being responsible for the constant introduction of disease and its being a menace to the native stock industry.

Live stock is imported into the Philippine Islands from:

A. Australia.
B. Indo-China (Pnompenh).
C. Other countries: China (Siangtan, Shanghai, Xuandai, Phu-yen); India; Borneo; Formosa; Java; United States.

The writer proposes to take up live stock importation only from Australia in this first article, leaving Indo-China and other countries for the future.

In this article the importation of Australian cattle on the hoof for beef purposes will be considered, dairy cattle, horses, dogs and other small animals being excluded because their importation is on only a very small scale and can be adequately and efficiently handled by the Bureau of Agriculture.

The writer maintains that importation of Australian beef cattle on the hoof should be permitted to land in the Philippine Islands for the following reasons:

I. Impracticability of obtaining a sufficient or satisfactory supply of native beef.
II. Native cattle have their place.
III. Economical problem.
IV. Sisiman quarantine station, stock-yards and abattoir.
V. Pleuro-pneumonia.
VI. Anthrax does not exist in the Northern Territory of Australia.
VII. Faith in the Bureau of Agriculture. (Committee named by Secretary of Agriculture upon request of Senate Committee on Agriculture.)

I. IMPRACTICABILITY OF OBTAINING A SUFFICIENT OR SATISFACTORY SUPPLY OF NATIVE BEEF

1. In the Philippine Agricultural Review, Vol. 15, 1922,

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page 140, under Statistics of Cattle for the year 1920, the cattle population, as given, numbers:

760,00 head
380,000 females, deducted from above leaves

380,000
80,000 work animals, deducted from above leaves

300,000
15,000 allow 5% for mortality and deducted from above leaves

285,000
213,750 cattle 1 year, 2 years and 3 years old, deducted from above leaves

71,250
35,625 for provincial consumption, deducted from above leaves

36,625 as the available supply for Manila consumption.

2. The fresh beef consumption for the city of Manila as follows:

100 head daily, of 100 kilos each, or
3,000 head monthly, of 100 kilos, or
36,000 head yearly, of 100 kilos.

Comparing these figures with the available supply, as given under 1, there is immediately noticeable a small shortage in the supply.

3. Our present available interisland transportation, I venture to state, cannot handle the necessary monthly number of head which should be brought into Manila for the following reasons:

(a) The average capacity for cattle, of each interisland steamer, is in the neighborhood of 100 head. This would necessitate 30 steamers for the whole month or one steamer daily bringing 100 head. This is not available.

(b) For the sake of argument, assuming that there is an available space on our interisland steamers, there is still the problem left that in certain seasons of the year it is impossible to load cattle at many of the interisland ports, particularly during the typhoon season. This occurs in the islands of Dalupiri, Fuga and the Batanes group.

(c) Of the majority of the native cattle which arrive in Manila, the greater part is skin and bone. This quality of cattle would not be considered for food consumption in any of the civilized nations, such as the United States, Britain and France. It would go only into sausage and fertilizers, while conditions here oblige us to use it for food consumption.

4. Those favoring the prohibition of live stock importation contend that when there is a scarcity, frozen beef would supply the demand. To this the answer is:

(a) Because of the particular style of the Filipino cooking, such as "Sinigang," "Linagang Vaca," and the like, frozen beef is unpalatable and, therefore, not acceptable.
(b) The greater mass of the native population do not possess ice-chests. Thus, frozen beef purchased at 6 o'clock in the morning, if not placed in the ice-chest during the day, is very likely to be obnoxious for the evening meal.
(c) It is contended that Filipinos do not have a participation in the large business of the country. It happens that in the case of the beef industry, it is altogether handled by Filipinos. But upon closure of importation the business will fall into the hands of the firms dealing in frozen beef and these are foreigners; thus another business out of Filipino control. Be it said that frozen beef is altogether handled by Australian and American firms.

5. In the Philippine Agricultural Review, Vol. 4, 1911, page 119, the report of the Forage Board, composed of army officers and the Director of Agriculture, comes out with the dictum that it is impracticable to obtain a sufficient supply of native beef for the Army in the Philippines.

6. I believe that the above-mentioned data prove the contention that there is not enough native beef and, if there should be, it is argued that it can last perhaps only one year.

II. Native Cattle Have Their Place

Native cattle have their place, for after all one-half of the city consumption is always taken up by the native cattle. Of course the native cattle owners do not receive the fabulous prices they want, but certainly a price that is right for the quality of the meat. Considering the way in which ranches are run here, the native cattle owner gets more than 100% return on his investment.

The fact that one-half of the city consumption is held by native beef should be considered a reasonable proportion for the native cattle, because it would deplete the resources of the live stock of the country—it is a just proportion. Let me remind you that during the years 1918-1919, when importation of live stock was not feasible, 36 per cent of the animals slaughtered were females, 20 per cent of which had fetuses. Continuing under these circumstances, the native cattle supply would soon be exhausted.

III. Economical Problem

1. When there is importation the gross price of dressed beef sold at the abattoirs is 53 centavos per kilo for Australian fresh beef and 65 centavos per kilo for native beef. Whenever there is not a supply of imported beef, the native beef immediately rises to from 75 centavos to P1.20 per kilo. This increase in price is paid for by the laboring class.

2. As soon as there is an increase in the price of beef, other

commodities such as fish, "tuyo," vegetable, mongo, etc., also increase in price. Thus, the laboring class who may have only 60 or 80 centavos for the market, on account of the increase in price, does not purchase meat but will buy instead the other commodities at the increased rate. This, of course, results in poor nutrition, and the corresponding poor physique eventually affects the efficiency of the individual and his services.

IV. Sisiman Quarantine Station, Stock Yards and Abattoir

1. This station is located outside of Manila Bay, across Corregidor, at a point in the province of Bataan. This station was selected by a committee appointed by the Director of Agriculture in 1911 and proved adequate for quarantine purposes. The cattle arriving in this station are landed at Lilinbon and routed through a 3-yard-wide drive-way, with wire fences on each side, and then enclosed in two corrals which are approximately about one hectare. These corrals have a double, barbed-wire fence and within are four cemented sheds approximately 100 x 244 meters. Each shed is divided into compartments holding 20 head of cattle. The matadero is 15 x 42 meters and is equipped perhaps better than the Manila matadero itself.

On one side of the corral there is a crematory. Upon arrival, the Australian cattle are immediately injected with anthrax serum for prophylactic purposes. There is a plentiful water-supply connected with a system of piping throughout the works. The cattle slaughtered are given antemortem and postmortem inspection. Blood is taken from the ear, stained and examined microscopically. The animal is then slaughtered and the carcass examined microscopically.

The above procedure has been adopted by the United States Army, in the control of anthrax in the Canal Zone, and Dr. Taylor[1] comes out with the definite statement that animals slaughtered and subjected to the above technic will surely and positively reveal anything in the way of anthrax coming over the killing-floor.

This procedure has the approval of the Bureau of Agriculture as well as of the Special Technical Committee appointed by the Secretary of Agriculture. This Technical Committee is composed of Dr. S. Youngberg, of the Bureau of Agriculture, Prof. Gregorio San Agustin, of the College of Veterinary Science, and Dr. Crisanto Panganiban, of the Bureau of Science.

[1]Taylor, W. J.: The control of anthrax in the Canal Zone. Jour. A. V. M. A., lviii (1920), n. s. 11 (3), p. 277.

V. Pleuropneumonia

Although Australian cattle suffer with pleuropneumonia, isolation at the quarantine station in Sisiman has shown, after many years of importation, that the disease has not endangered our native cattle in any way. Furthermore, it has been positively affirmed by Dr. Gilruth, an eminent veterinarian from Australia, that contagious pleuropneumonia can be transmitted only by direct contact. Australian cattle in Sisiman do not come in contact with any native cattle. Notwithstanding the thousands of head of imported Australian beef cattle, there has never been a single report of contagious pleuropneumonia occurring in the Philippine Islands.[2]

VI. Anthrax Does Not Exist in the Northern Territory of Australia

The Australian beef cattle imported into the Philippines come from the Northern Territory of Australia in Wyndham and Darwin. Australia reports that there is no anthrax in the Northern Territory. Dr. S. Youngberg, Chief Veterinarian, Bureau of Agriculture, was sent to Australia for the purpose of determining whether anthrax exists there. His 1923 report comes out with the positive statement that it does not exist in the Northern Territory of Australia.

It is true that in Western Australia there are cases of anthrax, but let me remind you that the distance between Wyndham and Western Australia in 2700 miles and the distance between Manila and Darwin is only 1900 miles. When you consider that the distance from Wyndham or Darwin to Sydney is farther than from Manila to Wyndham or Darwin, then you can imagine the immense territory that must be traversed through the country of Australia.

Practically the whole industry in the Northern Territory of Australia consists of cattle ranches. Perhaps the smallest cattle ranch will have at least 30,000 head. If anthrax would be present the very nature of the disease would immediately devastate this potential wealth. It might not be amiss to know that during the World War the two countries supplying the Allied Armies with frozen meat were Australia and Argentina.

A description of the drive which the Australian imported cattle have to make will perhaps show the impossibility of the existence of anthrax among them. The cattle imported here come from a

[2]Gearhart, Frank C.: Report on live stock conditions and other matters in Australia. Bur of Agr., 1910.

region very distant from Darwin and Wyndham, some 400 to 500 miles. The cattle travel at the rate of 7 to 8 miles a day, so that in many cases they are on the road from 40 to 60 days. Should there be anthrax among them they would surely succumb during this long journey. Then there is still the nine-day sea voyage. The veterinarians on board ship have not found a single case of anthrax among the animals that die on board. I have gone to explain the above at length, because it has always been reported that the Australian cattle imported suffer with anthrax. I believe I have shown the contrary.

In 1923 the Australian cattle contracted anthrax at the Sisiman Quarantine Station on account of the native hay being fed to them. Simultaneous with this outbreak, the severe anthrax outbreak in Central Luzon also appeared. There had been statements made that this latter infection is due to the Australian cattle. I want to bring to your attention that March, 1922, was the beginning of the severe outbreak of anthrax at Canlubang in the Calamba Sugar Estate in Laguna. Therefore, this severe outbreak started, not in Sisiman, but rather in Canlubang.

As a further proof that we have always had anthrax in the Philippines, I wish to draw your attention to the Nineteenth Annual Report of the Bureau of Agriculture for the fiscal year ended December 31, 1919, page 32, which says, under anthrax: "Sporadic cases continue to occur from time to time in the regions where it has for so long been enzootic, notably along the shores of Laguna de Bay and in certain sections of northern Mindanao."

One further proof is the Eighth and Ninth Annual Reports of the Bureau of Animal Industry, from the U. S. Department of Agriculture, for the years 1891 and 1892, pp. 354 and 355. These reports positively describe the existence of anthrax in the Philippines as far back as the year 1888. But, if they are still doubtful, I wish to refer you to a very valuable page from the library of W. E. Retana, entitled "Una Epizootia en Filipinas, Memoria Presentada por el Veterinario Militar D. Gines Geis Gotzens," where it describes beautifully the existence of anthrax as far back as the year 1887.

I have taken the liberty to produce these proofs to demonstrate to you that we have always had anthrax here in the Philippines and it is not due to the importation of Australian beef cattle. It can be stated with safety that on account of the nature of anthrax, with or without importation, it will recur in the island of Luzon and perhaps in many other islands. The only way to

combat anthrax is by vaccination from year to year. This has been the experience of countries where anthrax has been present, as in the United States, in Java and in France.

In conclusion I wish to go on record that the importation of beef cattle from the Northern Territory of Australia is free of danger from rinderpest, foot-and-mouth disease or anthrax. That, although suffering with pleuropneumonia, on account of our climatic conditions and the nature of the disease itself, it has never been a menace to the Philippine cattle industry.

And, therefore, the importation of Australian cattle for slaughter purposes, quarantined at Sisiman Quarantine Station, is safe and sane and its prohibition under the cloak of being diseased should never be tolerated.

VII. Faith in the Bureau of Agriculture

Much has been insinuated against the Bureau of Agriculture and its method of handling imported live stock. This criticism, however, comes partly from laymen but in the eyes of technical men the handling of the situation meets with approval.

Nevertheless to prove further the conscientiousness of those having the responsibility, the Secretary of Agriculture, upon the suggestion of the Senate Committee on Agriculture, appointed a technical committee composed of:

Dr. S. Youngberg, Chief Veterinarian, Bureau of Agriculture.

Dr. Gregorio San Agustin, University of the Philippines.

Dr. Crisanto Panganiban, Bureau of Science.

And the above men have affixed their signature and approved the rules and regulations laid down by the Bureau of Agriculture, thus offsetting destructive criticisms.

Serious Malady

Jim: "Say, Bill, I heard you were sick last week."

Bill: "Yes, I was. I had the new disease called the 'clothing, sickness."

Jim: "What on earth is that?"

Bill: "Well, I had a coat on my tongue and my breath came in short pants."

Bray-zen Comment

When the donkey saw the zebra
He began to switch his tail;
"Well, I never," was his comment,
"Saw a mule that's been in jail."—*Burr.*

THE VETERINARIAN IN HIS COMMUNITY*

By C. E. KROSCH,

Blue Earth, Minnesota

When a veterinarian decides to enter into practice, he selects the location; the location does not select him. Once the location is selected it is usually announced in the local *Bugle* that Doctor So-and-so has decided to locate in the town and will have his office in the Wiston Building. We all hope that he has not decided to have an office in the old livery stable or feed-barn, for there is nothing that seems to belittle the profession as much as to have the veterinarian acting as High Priest of a livery stable or feed-barn. Have an office, even if it is not more than four feet square.

We will say nothing about the veterinarian's professional ability, for as every graduate leaves college, with his sheep-skin under his arm, he feels that he is capable of conquering the world. All that is necessary is that the cases present themselves for his pill-gun, hypodermic needle or scalpel.

The veterinarian's general appearance quite often has much to do with his getting started off on the right foot. By this I do not mean that he should be dressed as a Beau Brummel, but he should be neat and clean shaven, and keep his office in the same condition.

In starting in practice, the new veterinarian often has considerable time on his hands. This is the proper time to start work on your hobby. If you do not have one, develop one. It makes no difference whether it is a registered sow, a good dairy cow, a flock of chickens or a batch of bull pups. This will soon be noticed. Soon Mrs. Smith will tell Mrs. Brown about the Doctor's chickens, and if he can make his lay in the winter, why can he not advise us about ours, so that they will be laying when the price of eggs is high? This is one way that the veterinarian can obtain some good advertising—by exhibiting his pigs and chickens at the county fair.

One should not fail always to have a "Good morning" for every one that he meets on the street, regardless of whether you know the man or not. He may want to get acquainted with you, some time, but if you never speak to him he will hesitate a little about calling you.

*Presented before the twenty-eighth annual meeting of the Minnesota State Veterinary Medical Association, Minneapolis, Minn., January 14-15, 1925.

You will be approached to contribute to the Commercial Club and various other civic organizations. You may feel that you cannot afford to do this or wonder what good this will do you. However, you will find that you will gain a little prestige by having your name listed with those who are members of the Commercial Club. The veterinarian should be the first to stand back of any movement that is for the betterment of the town in which he lives. The veterinarian can help himself a little, as well as do the town some good, by helping the council work out a milk ordinance. It gives the dairy inspector a chance to do some tuberculin testing, even if Dr. Cotton has informed us that the state funds are exhausted. However, the state law allows testing to be done for a city milk supply. It also speaks well for the town that has a milk ordinance. One finds that the quality of the milk is much improved and the dairymen seem to try to keep their places a little cleaner, especially where they have access to the dairy inspectors' reports at the city hall.

Perhaps you have another veterinarian in your town or in the neighboring town. He may be a neighbor or may be a dirty competitor. We find written in the twelfth chapter of Romans: "Live peaceable with all men as far as possible." Sometimes this is not possible. However, do not be the one to sling the mud. Have him in to help with those difficult cases and in consultation, if he will work with you. When he tells people that you do not know enough to vaccinate hogs, and states in public that your knowledge and experience is very limited, you may feel that you have been done a great injustice, and want to start telling the farmers what *his* short-comings are. But do not do it. It will only hurt you more than it does him. Every time he knocks you, it has a rebound effect, hurting him and helping you. That is when people find that you are on the square. Some client may tell you that he thinks that Doctor Jones, at Many Lakes, is a crook and no good. Even if you know this, keep quiet. After you are gone he will think that he did not get very far with you in knocking Jones, even if he is sure that you have no friendly feeling toward him. His estimation of you will be much higher.

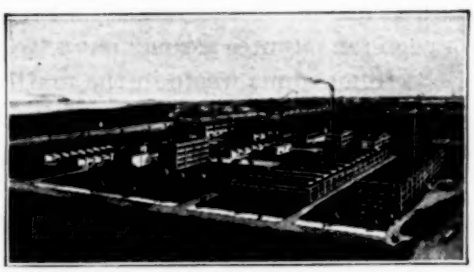
In the field, nothing will disgust a client more than for the veterinarian to pull on a pair of overalls that look as if they had been used by the local butcher, the past six months, at the slaughter-house. It may require having several suits, but one should always have some clean ones in the car. The veterinarian's instruments should be kept in good condition. It is humiliating

to have a client offer to let you use his knife to cut a bull and have him tell you that his is good and sharp. It may not seem necessary to you, but it makes quite an impression on a client if you clean your hypodermic syringes with a little alcohol, before an injection. In talking with a recent graduate, the other day, he stated that if he ever went into practice, he would make his technic look like a ten-dollar operation, even if it was only to open a collar-boil.

And last, but not least, remember to cooperate with your live stock sanitary board. They are standing back of you in more ways than one, and they can not function properly without the assistance and cooperation of the practitioners throughout the state.

ABBOTT LABORATORIES IN NEW LOCATION

The new plant of the Abbott Laboratories, which is now nearly ready, will be among the finest and most complete pharmaceutical and research plants in the world. Here the newest synthetic, medicinal chemicals will be made in large quantities by improved processes, insuring purity and accuracy. Here also will be extracted from the crude drugs the medicinal principles used largely throughout the pharmaceutical industry as well as by the medical profession.



Larger quarters will be provided for the extensive research work now being carried on by a large staff of chemists and new buildings are being provided for the manufacture of the well-known Abbott pharmaceutical specialties.

The administrative office of The Abbott Laboratories, located for many years in Ravenswood, will be moved, about October 1, to the new plant. The postoffice address will be Waukegan, Ill., 25 miles north of Chicago on the C. & N. W. R. R. About 24 acres of ground are owned by the Abbott Company, to provide for the future expansion of their business.

MARKETING HOGS FROM ACCREDITED COUNTIES*

By H. R. SMITH

Commissioner, National Live Stock Exchange
Chicago, Illinois

The nation-wide campaign to eradicate tuberculosis in live stock, inaugurated in 1917, has made wonderful progress, particularly during the past two years. The people in the United States want to see this work completed as soon as it can be done. Tremendous interests are involved in this great enterprise. The large annual loss through the condemnation of beef and pork under our thorough system of meat inspection is insignificant compared with the human interests in the matter of conserving the lives of the people of this country, through removing the cause of what medical authorities say is responsible for approximately one-third of the tuberculosis among people.

The economic loss can be pictured to the best advantage by a statement based on definite information from the Chief of the Bureau of Animal Industry of the United States. If we were to take the total number of cattle and hogs, condemned outright for tuberculosis by the United States Government during the fiscal year ending June 30, 1924, and assemble these cattle and hogs, before slaughter, at one shipping point, there would pass over the rails in their exodus to the grease-tanks, one train-load of thirty cars for each ten minutes throughout a twenty-four-hour day. Think of the tremendous waste in the matter of feed that has gone into these animals which, after slaughter, are consigned to the rendering tanks for grease and fertilizer. But this story is only partly told. If we could determine the number of cows that die on our farms annually from tuberculosis, it would reach a large total.

From recent surveys made on poultry flocks in many parts of the country, it seems probable that the loss to this industry, caused by tuberculosis, is greater than the loss to either the cattle or swine industry.

But the past year has brought great hope for the situation. It has been completely demonstrated that tuberculosis in cattle and hogs can be practically eradicated from any county if proper methods are employed. The success thus far made in this

*Address delivered before the thirty-seventh annual meeting of the Iowa Veterinary Association, Des Moines, Iowa, January 20-23, 1925.

nation-wide campaign is proof of the fact that when the American people become aroused as to the seriousness of any disease in farm animals, means can be made to conquer it. This has never been more completely demonstrated than in the campaign to eradicate tuberculosis. The following figures, showing the increase in the number of cattle tuberculin-tested in the United States, annually, are significant:

Year	Cattle Tested
1917	20,101
1918	134,143
1919	329,788
1920	700,670
1921	1,366,358
1922	2,384,236
1923	3,460,849
1924	5,300,000

To date more than ten million dairy and breeding cattle have been tuberculin-tested, and out of that number there were found approximately 400,000 reactors. Practically all of these have been slaughtered, the premises disinfected, and the owners reimbursed for a considerable part of the loss sustained. The removing of this large number of tuberculous cattle, many of which were spreading the infection to other individuals, has not only checked the increase that took place in tuberculosis among cattle up to 1917, but there has resulted a marked decline in the percentage of cattle retained for tuberculosis at the various packing-plants throughout the United States. Counting all cattle slaughtered under federal inspection, including steers from the western range, which have but little tuberculosis, statistics from the office of the Division of Meat Inspection show that, whereas during the year 1916, 2.6 per cent of all cattle slaughtered that year were retained for tuberculosis, during the year 1924 the statistics show that 1.7 per cent of the cattle slaughtered were retained for tuberculosis.

The great increase in the testing of cattle during the past few years can be attributed to increased appropriations, and more recently to the inauguration of the plan of area-testing, which makes it possible to do a much greater volume of testing at less expense. During the year 1917 the total funds available for testing cattle in the United States were approximately $300,000. This year, federal, state and county funds will exceed $10,500,000.

the greater part of which is used to reimburse owners of cattle which react to the test and are slaughtered.

The Iowa Work

Iowa was one of the later states in inaugurating work to eradicate tuberculosis. The first appropriation of $100,000 annually was made six years ago. This was later increased, and two years ago the so-called Area Law was enacted, which has put Iowa in the forefront. It can be safely stated that Iowa has the best law of any state in the union for the eradication of tuberculosis in live stock. It not only provides an up-to-date plan but also the means of financing the work until it is completed in each county. The provision for a special county levy is largely responsible for the volume of work now being done. During the past year Iowa has gone ahead of all states in the Union in the number of cattle tested. Records from the U. S. Department of Agriculture show that on December 1, 1924, Iowa had tested a total of 1,024,995 cattle, as compared with 774,456 in Wisconsin, 581,658 in New York, and 541,339 in Michigan. The special county levy available this year in forty-five Iowa counties totals $712,849.83, which, with the state and federal funds available in Iowa, gives a total in excess of $1,150,000 for this fiscal year. With this fund, the greater part of which is used to reimburse owners, and with the careful, conscientious work that is being done by the veterinarians of Iowa, wonderful progress is being made, and the present indications are that this state, which has perhaps been suffering a greater loss caused by tuberculosis by virtue of the development of the live stock industry and the high percentage of infection, will be one of the first to be made practically free from this disease.

County Area Testing

In the accredited-herd plan of testing individual herds, which work predominated until two years ago, tuberculosis was eliminated to a large extent from the pure-bred herds of cattle throughout the country. This was a desirable preliminary because of the fact that these pure-bred herds which are distributed throughout the country for breeding purposes, cause a greater dissemination of the disease than grade herds.

Now, area work is given much greater prominence in order that all breeding cattle may be tuberculin-tested and the disease completely eradicated, county after county. Up to date, under this plan, fifty-two counties in the United States have been

officially accredited as being practically free from tuberculosis. Removal of these tuberculous cattle has eliminated a large part of the cause of tuberculosis in swine, as indicated by postmortem reports on hogs from such counties. It so happens that one of the first gorup of counties officially accredited, and the first county to receive the benefits of the ten-cent premium on hogs, was my home county—Hillsdale, Michigan. While the premium paid on hogs from these accredited counties is not subject to any postmortem inspection, the county certificate being the guarantee of cleanliness, we asked the Buffalo packers to kill separately all hogs from that county on which the premium has been paid since the county was accredited.

To date this premium has been paid on 30,000 hogs in Hillsdale County and the farmers of that county have received premium checks totaling slightly in excess of $7,500 above what the hogs would have brought if the county had not been tuberculin-tested and accredited. Based on the average infection found in surrounding territory, there should have been found among 30,000 hogs, approximately 150 requiring to be condemned and sterilized on account of tuberculosis. As an actual fact there were found in these 30,000 hogs only ten that had to be condemned and fifteen that had to be sterilized.

The Buffalo packers are well pleased with the results and consider the payment of the extra ten cents a good investment. Farmers and auctioneers of that county have stated that the dairy cattle of the county are commanding $15 per head more than the same class of cattle in surrounding counties. Eastern buyers want cattle from clean territory and are willing to pay for them.

Winnebago County, Iowa, has been accredited approximately five months, and during that time the farmers of Winnebago County have received premium checks totaling $9,700 on their hogs. The cost to the county was $8,000. It will be but a short time until the premium money will exceed the entire cost, including the expenditures of federal and state funds in Winnebago County.

Wapello County, Iowa, was accredited January 2. Most of these hogs are sold to the Morrell Packing Company, at Ottumwa, which concern has already paid the ten-cent premium on 2500 hogs bred and fed in Wapello County, when the consignments were accompanied by a proper certificate. The practice at most of the markets is to sell the hogs in the regular way, without giving

information that they come from an accredited area until after the deal is closed, when the certificate is presented and the premium check drawn. I was told, a few days ago, by one of the hog salesmen in Chicago, that he could get a larger offer by first announcing that they come from an accredited area, after which the premium is paid in addition to this higher selling price. It would seem from this statement that some of the packers feel that buying hogs from non-accredited counties amounts to a risk in excess of ten cents per hundred.

Swine Tuberculosis

But very little has been done in the testing of herds of swine, for it has been assumed that the disease among hogs comes almost entirely from cattle through infected milk and droppings. Statistics to date show but a slight decrease in pork condemnations and a material increase in retentions.

Avian Tuberculosis

While the condemnations in hogs from accredited counties have been nearly eliminated, we are still finding a high percentage of slight lesions which we know, from recent investigations, come from chickens. We made arrangements to have a number of the diseased glands from Hillsdale County hogs shipped to Doctor Van Es, of the University of Nebraska, one of our best authorities on avian tuberculosis. He inoculated chickens and guinea pigs with the glands, with the result that all the chickens contracted the disease but only one guinea pig responded, which proved to him that these hogs had the avian type of tuberculosis. A check was made in another way, by the federal authorities, by tattooing hogs from Hillsdale County so that the number could be seen in the skin after the carcasses were scraped. By these numbers it was possible to trace the diseased hogs back to the farms from which they came.

In most of these cases no tuberculous cattle had been found on the farms during the county-wide test. Hogs left on these farms were injected in one ear with avian tuberculin and in the other ear with the ordinary tuberculin, and practically all responded to the avian tuberculin. Doctor Van Es has also inoculated chickens and guinea pigs with a large number of tuberculous glands taken from hogs slaughtered at Omaha, Nebraska City and Sioux City. He reports that 88 per cent of these glands showed the avian type. The University of Illinois investiga-

tions along this line show that 67 per cent of the tuberculous glands from Illinois hogs slaughtered at Chicago showed avian tuberculosis. The higher percentage of tuberculous cattle in northern Illinois, as compared with Nebraska, is probably responsible for the higher percentage showing the avian type in Doctor Van Es' investigations.

Fortunately, the avian type, as contracted by hogs, causes practically no condemnations. There is, of course, a large accumulative loss in swine, caused by avian tuberculosis, in the matter of heads and viscera condemned for tuberculosis. We do not have enough data as yet to give an accurate estimate, but from present knowledge it would seem safe to say that the removal of the tuberculous cattle from any county eliminates at least three-fourths of the loss caused by tuberculosis in swine.

Infection is Extensive

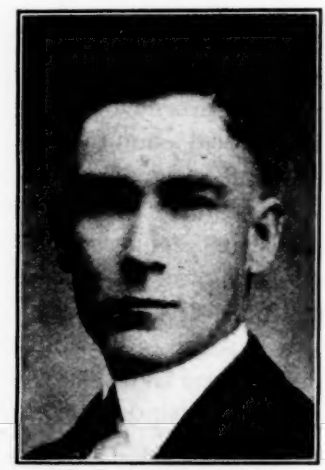
Apparently the avian type of the tubercle bacillus does not thrive on pork, and the lesions are slight, but so many hogs are found infected with the avian type that something must be done to eliminate this loss if our work is to stand up as it should. The presence of tuberculosis in poultry is greater than most of us realize. The culling out of chickens that show the presence of tuberculosis, by physical symptoms, is a work of vital importance, not alone because of the effect on swine, but also because the existence of this disease among chickens means much less productive flocks. I have been informed by county agents who have made limited surveys in local communities, that it frequently happens that more than fifty per cent of the flocks are found infected. Poultry experts inform me that the practice of giving chickens the run of the entire premises, where infected droppings are left in the pig troughs and on the ground, is not as profitable in egg- or meat-production as the practice of the system whereby the chickens are kept within fenced inclosures where green crops can be supplied. Ground that is not ploughed occasionally is certain to become infected with disease germs of various kinds. These poultry experts say that it is not profitable to keep chickens more than two years old. It is the older fowls that spread most of the tuberculosis while, as you know, advanced cases give physical symptoms as indicated by emaciation, paleness of comb, and occasional lameness. You men, of course, are familiar with evidences on postmortem, such as white or yellow spots on the liver and nodules along the intestinal tract. While many chickens

show physical symptoms, a much larger number give no outward evidence of the disease which, as you know, is also true in cattle and hogs.

It would seem that the eradication of tuberculosis in poultry now offers a wonderful field for those who are well informed on this subject, and can give a good part of their time to the culling of poultry and to the application of the tuberculin test on fowls where such is found desirable. A great need, however, so far as poultry is concerned, is the matter of culling intelligently and the use of better methods of feeding and management. It has already been demonstrated that tuberculosis in cattle can be practically eliminated, and I think we will all agree that this problem, in so far as it affects poultry, can be solved if it is given proper consideration.

A BUSY MAN

Dr. R. S. Christman (San Fran. '17) of Marysville, Cal., is reported to be one of the busiest veterinarians on the Pacific Coast. Although he received his veterinary degree almost eight years ago and has been engaged in private practice during this period, he has found time to take up the study of law, and



DR. R. S. CHRISTMAN

recently passed the bar examination for the state of California. Three years ago Dr. Christman was appointed city meat inspector for Marysville and about a year ago was appointed city health officer. At the present time he is performing the duties of both of the offices named, besides conducting his veterinary practice.

RECENT INVESTIGATIONS ON BLACKLEG IMMUNIZATION*

By JOSEPH P. SCOTT, *Manhattan, Kansas*

Kansas State Agricultural Experiment Station

Blackleg biologic products are of very great practical importance. The quantity used at present is second only to that of anti-hog cholera serum and virus. The report of the Bureau of Animal Industry for 1923 records the production of 733 million cubic centimeters of anti-hog cholera serum, which, at an average dose of 40 cc, represents over 18 million doses. The same report shows that seven and one-half million doses of blackleg products were produced, divided as follows: blackleg aggressin, four million doses; blackleg filtrate, one-half million doses; blackleg vaccine, two and one-half million doses; and one-half million doses of the new product, blackleg bacterin. Other biologic products produced in large amounts are: mixed infection bacterin for all species, five and one-half million doses; hemorrhagic septicemia bacterin three million doses.

Immunization against blackleg, by means of an attenuated muscle powder obtained from typical cases of the disease, has been practiced since 1877, when Arloing, Cornevin and Thomas[1] developed the Lyons type of vaccine. This method of vaccination was introduced into Kansas by Mayo,[2] in 1897, and, from that time to the present, investigations on blackleg immunization have been carried on at the Kansas State Agricultural Experiment Station. Improvements in the methods of production and use of powder vaccine were developed by Fischer and Kinsley,[3] in 1900, and by Mayo and Barnes,[4] in 1904. Roux,[5] in 1888, immunized guinea pigs by means of filtered cultures and also by filtered tissue extracts from cases of blackleg. Schobl, in 1910, also immunized guinea pigs by means of tissue extracts. Other workers, Leclainche and Vallée, Kitt, Grassberger, and Schattenfroh used antisera and antitoxins in an experimental way.

Preliminary work leading to the development of blackleg aggressin and antiserum was started at the Kansas Station in 1910, by Franklin and Haslam, following a serious outbreak of the disease in Kansas. In 1916 this work had progressed to the

*Contribution No. 32, Veterinary Department, Kansas State Agricultural Experiment Station. Read at the twenty-first annual meeting of the Kansas Veterinary Medical Association, Manhattan, Kansas, February 4-5-6, 1925.

stage of extensive production of anti-blackleg serum and virus and blackleg aggressin. A federal license for the production and interstate shipment of these products was issued in 1916. In 1917 Goss[6] and the writer developed the product known as blackleg filtrate.

The three products, blackleg aggressin, which is produced by growing the blackleg organism, *C. chauvei*, in a susceptible calf and filtering the juices obtained from the affected parts, blackleg filtrate, produced by growing the organisms in artificial culture media, and anti-blackleg serum, produced from hyperimmunized horses, form the basis for the prevention of blackleg. Before any vaccination was practiced this disease killed from 5 to 20 per cent of all young cattle in the Southwest. Today the losses where proper vaccination is practiced are less than one in 10,000.

Since 1918 the Kansas State Agricultural Experiment Station has been conducting investigations with the object of solving several important questions regarding the blackleg products, among which the following may be mentioned: (1) How can the potency of blackleg products best be determined in the laboratory? (2) How is immunity against blackleg actually produced? (3) What is the action of heat, cold, and storage upon blackleg aggressin and blackleg filtrate? (4) Is there any difference between the potency of blackleg aggressin and blackleg filtrate? (5) Which of the two products is of the greater practical use? (6) What strains of *Clostridium chauvei* produce the most potent filtrate? (7) What factors are concerned in losses following the use of aggressin and filtrate? (8) What is the length of immunity produced? (9) At what age are cattle susceptible to blackleg? (10) How does the infection gain entrance into the body?

A study of these questions has given a more thorough understanding of the disease and has offered an interpretation of some of the factors involved in the production of immunity against blackleg. A summary of the results thus far secured will be given in the following paragraphs, arranged in the order just listed.

Potency Tests

Two potency tests have been developed by which it is possible to titrate the amount of aggressive substance in a dose of blackleg aggressin or blackleg filtrate. These tests depend upon

the fact that these products are non-toxic but will so activate non-lethal doses of virus as to produce death in the test animal. In the first test the aggressive strength is determined by finding out how much filtrate or aggressin is required to activate a definite non-lethal amount of blackleg virus, thereby producing death in a guinea pig immunized by the administration of 15 units of anti-blackleg serum. The same results are obtained from the second test, in which the smallest amount of aggressin or filtrate that will activate a unit of avirulent washed virus is determined. The aggressive unit or unit of potency is that amount of aggressive substance that will neutralize one unit of anti-blackleg serum.

Data accumulated in applying these two tests have led to the following important deductions.

(A) Cultures of the organism, or virulent muscle-juice, can produce the lesions of blackleg only when they contain a certain minimum of living cells, or viable spores, together with a certain amount of the products of growth of the organism.

(B) The cells or spores of a virulent culture contain a substance called for convenience the "lethal substance," upon which the degree of virulence of the culture depends.

(C) The amount of aggressive substance produced is independent of the lethal substance.

(D) The aggressive substance is the same whether it is produced in the body of the calf or in culture media.

These deductions indicate that there are three independent substances concerned in the production of the lesions of blackleg: (1) The living cell of *C. chauvei*. (2) A lethal substance found only in virulent cultures. (3) An aggressive substance produced both by virulent and avirulent strains during the growth of the organism.

Production of Immunity

It has been demonstrated that immunity can not be produced by the use of cells freed from all the products of growth, but can be produced by the use of attenuated or killed cells mixed with the products of growth, or by means of the products of growth alone.

The powder type of vaccine contains viable attenuated cells which are rich in lethal substance and are introduced in such a way that a certain amount of growth takes place. The immunity produced acts chiefly against the lethal substance. The difficulty

of this type of vaccine is principally one of production. The production of an attenuated vaccine of sufficient potency to bring about immunity and not cause blackleg in hypersusceptible calves is practically impossible. Losses have been reduced, by the use of this vaccine, from 5 to 20 per cent to about one per cent.

The liquid spore vaccine of Leclainche and Vallée[7] contains attenuated organisms together with their products of growth. This vaccine is extensively used in France and Brazil. A blackleg bacterin containing killed organisms has recently been produced by Franklin. These two forms of vaccine theoretically produce immunity by stimulating antibacterial substances and causing the production of anti-aggressin, and possibly anti-lethal substances if any lethal substance remains in the attenuated cells. Blackleg filtrate and blackleg aggressin contain only the aggressive substances and produce immunity by the development of anti-aggressive substances.

Action of Heat, Cold and Storage Upon Blackleg Products

Since potent aggressin can be produced by extracting the muscle-juices by the freezing and thawing method, it is evident that freezing will not materially alter its potency. The aggressive substances being the same, it is evident that freezing will not alter the potency of filtrate. Heating filtrates and aggressins to 60° C. increases the potency from 50 to 100 per cent. This degree of heat is sufficient to coagulate the proteins found in aggressins. Keeping aggressins and filtrates for several years in the ice-box does not diminish their potency, while storage at room temperature or even in the incubator for several months increases rather than decreases their potency. The potency of anti-blackleg serum kept in the ice-box for four years shows no appreciable decrease.

These results show that blackleg products are very stable and if kept under good conditions will remain potent for long periods of time.

Is There Any Difference Between Filtrate and Aggressin?

No difference can be shown in the antigenic substances found in blackleg filtrate and aggressin. Both products react in an identical way to (1) toxicity tests, (2) aggressive-action tests, (3) virus-protection tests on both guinea pigs and calves, (4) the action of heat, and (5) keeping qualities. The only apparent

difference between the two products is that in the case of the aggressin the antigenic substances are developed in the body of a calf while with the filtrate the same substances are developed in artificial culture media.

It has been found that the refiltration of aggressin decreases its potency to a very marked extent; this is not true of filtrates. This is probably due to the presence of muscle and serum proteins in the aggressins which absorb the aggressive substance and which are readily held back by the filter candles. In one experiment an aggressin that had been filtered three times was compared with a filtrate that had also been filtered three times. Three calves injected with this aggressin died when inoculated with virus 49 days later; none of the three calves injected with filtrate showed any visible reaction. On repeating the test with the aggressin, two calves were killed and the third showed marked lameness.

Which Is of More Practical Value?

If properly prepared, both blackleg filtrate and blackleg aggressin will produce immunity in cattle. An examination of the data tabulated from the use of 160,000 doses of blackleg aggressin and 260,000 doses of blackleg filtrate shows losses of less than one in 10,000. Since sterile, potent aggressin is slightly more difficult to produce and, in addition, its production involves the unnecessary destruction of valuable food animals, it would seem that blackleg filtrate is the product of choice. The one possible advantage of aggressin is that in its production the calf acts as its own bacteriologist and thus ensures the production of an essentially specific product.

What Strains Produce the Most Potent Filtrate?

It has been found that there is no difference in the amount of aggressive substance produced by virulent or avirulent strains of *C. chauvei*, or by the same strain in a virulent and non-virulent state. This has made possible the use of a greater number of strains of *C. chauvei* in the production of blackleg filtrate and thus a highly polyvalent product is ensured.

Factors Concerned in Losses Following Use

The losses following the use of blackleg filtrate and aggressin are practically nil when they are properly used. Three sources of losses may occur in field practice.

(A) Several reports of loss following the treatment of very

young calves with aggressin or filtrate have been reported. These losses may be explained on the assumption that very young calves do not develop anti-aggressins in sufficient amounts to protect them for more than six months.

(B) Losses due to a mixed infection with *C. chauvei* and *C. edematis* have been noted. In these cases the animals would probably have resisted an infection with *C. chauvei* alone. Other anaerobes, some of which were non-pathogenic, have also been found in several cases. In Germany and Switzerland, where Graub and Zschokke[8] have been using a filtrate, they find that losses following its use are due chiefly to the Kitt blackleg type, which is in reality *C. edematis*.

(C) A few cases of an aggressive action following the use of filtrate in calves vaccinated a short time previously with the powder form of vaccine have been reported. The same thing was seen in two infected herds when animals already infected were injected with filtrate or aggressin.

How Long Does Immunity Last?

Experiments on calves to determine the exact length of the immunity produced by the use of filtrate and aggressin have not been made; the longest test period reported by any worker is sixty days. Most of the experiments at this laboratory have been for periods of from twenty to fifty days. Field reports and experiments indicate that calves vaccinated when six months of age will be protected throughout their period of susceptibility or, in other words, for life.

Age at Which Blackleg Has Been Observed

Several cases of blackleg in calves, from four days to three weeks of age, have been recorded and, in an outbreak, the vaccination of all calves dropped, as soon as they are three days old, will stop further losses. Such calves should, of course, be revaccinated when six months old. Cases of blackleg have been noted in cattle from four to six years of age and in one instance in a dairy cow approximately ten years of age. The usual age of occurrence is six to eighteen months.

Portal of Entrance of the Infection

The organism may enter the body through abrasions or wounds in any part of body. Recent work by Ronca,[9] on the production of blackleg in guinea pigs by the introduction of the virus into the intestinal tract, and previous work by Wulff[10]

shows that the blackleg organism frequently enters the animal body through the digestive tract. A septicemic form of the disease has also been described.

From these observations it is evident that the immunity produced by filtrate and aggressin will protect cattle if these products are properly produced and administered. The disease is produced only if the three factors—lethal substance, viable cells, and aggressive substance—are present at the same time. It is dangerous to use filtrate or aggressin in animals recently injected with a vaccine containing lethal substance, such as the powder vaccine. It is also dangerous to use these products in infected herds. The apparently good results obtained in infected herds may be explained upon the assumption that death will not occur unless the three substances are present in sufficient amount. In some cases the calves that were apparently cured, by filtrate or aggressin, were probably not infected with a sufficient amount of the lethal substance to produce death. In other cases probably all the infected animals had died prior to treatment. Infected herds should be given anti-blackleg serum rather than filtrate or aggressin.

The following points of importance concerning all biologic products are often ignored or misinterpreted:

(1) The expiration date on biologic products indicates that the product, if properly handled, will produce good results until the time specified and should not be used thereafter. The potency of such stable products as aggressin and filtrate *may* last for a much greater length of time.

(2) Clearness, or cloudiness, of the product does not necessarily bear any relationship to potency, contamination, or toxicity of the product. Precipitates may be formed by the action of the preservative on the product, by the action of the product on the glass container, or by the heat used to sterilize the containers before they are filled. In none of these cases is there loss of potency or bacterial contamination. Some of the clearest products have been shown to contain pathogenic organisms.

(3) Always keep biologic products in a dark, cool place; light has possibly a greater deteriorating effect than does heat.

(4) Products containing live organisms or viruses, whether they are present as the antigenic substance or as a contamination, deteriorate much more rapidly than sterile products and must be kept with special care.

(5) The price of the product is no indication of its value. However, biologic products can not be produced at cut-rate prices.

(6) The preservative use in biologic products is not added for the purpose of sterilizing the product but to assist in keeping an already sterile product. The strength of preservative used is frequently insufficient to inhibit bacterial growth if the product is contaminated and kept under improper conditions.

Summary

1. There is no difference in the properties of blackleg filtrate and blackleg aggressin.

2. Blackleg filtrate is the product of choice, as its use obviates the destruction of valuable animals; its production is under control at all times; and it can be made more highly polyvalent than blackleg aggressin.

3. Calves should be vaccinated when six months of age, or, if vaccinated when less than five months of age, they should be revaccinated six months later.

4. Infected herds should be treated with anti-blackleg serum.

5. Blackleg aggressin and blackleg filtrate are stable to heat up to at least 65° C., and they maintain their potency for many years. Anti-blackleg serum also holds its strength for years when kept under proper conditions.

6. A virulent blackleg virus contains three parts: (a) living cells, (b) a lethal substance contained in the cell, and (c) an aggressive substance secreted by the cell.

7. Blackleg may be caused by the ingestion of contaminated food.

8. A septicemic form of blackleg may occur, especially if there is a mixed infection containing *C. edematis.*

9. Properly vaccinated animals will withstand infection with *C. chauvei* and also usually with mixed infections of *C. chauvei* and allied anaerobes.

10. Blackleg being due to an organism which persists in the soil can be controlled only by the continuous use of proper vaccination methods; it can not be eradicated.

11. The use of powder vaccines is accompanied by a loss of approximately one per cent.

12. Symptomatic anthrax of swine and similar diseases of sheep, whales, and horses are caused by *C. edematis* and not by *C. chauvei.*

13. While blackleg is typically a monobacterial or specific disease caused by *C. chauvei*, *C. edematis* and other allied organisms may sometimes be associated with it.

14. Protection against *C. chauvei* will protect against blackleg infection in nearly all cases, whether the infection is pure or mixed.

15. Traumatic blackleg following parturition, castration, etc., is essentially an infection with *C. edematis*.

16. Filtrates of cultures of atypical strains or of cultures of organisms belonging to other anaerobic types do not produce a potent product.

17. A complete report of these experiments will appear in a forthcoming issue of the *Journal of Bacteriology*.[11]

In the discussion following this paper the following points were brought out:

1. That the dose of blackleg filtrate or aggressin was five cubic centimeters for all animals. That a larger dosage might be used with advantage but it was inadvisable to use less than five cubic centimeters.

2. That the injection of calves in several parts of the body with blackleg virus for the production of aggressin did not necessarily increase the amount of aggressin obtained.

3. That the inclusion of an appreciable amount of normal muscle tissue or the use of too highly diluted preservatives in the production of aggressin or filtrate would very possibly decrease the potency of the product to a considerable extent.

4. That vaccination against blackleg should be performed a week or two weeks before castration or dehorning, whenever possible. These operations open up new channels of infection and recently treated calves may be more susceptible to blackleg. In the case of large herds and of animals not easily handled the cost of the double treatment might be greater than the possible losses following simultaneous vaccination and operation. This is especially true in healthy herds on relatively non-infected premises, but in herds in which losses have occurred vaccination and operation simultaneously may be disastrous. Such herds should be given anti-blackleg serum.

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A FATAL DISEASE OF FEEDER LAMBS*

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With the growth of the feeder-lamb industry, disease control has become correspondingly important, as is shown by the fact that the mortality rate is higher when larger numbers of lambs are congregated.

The study of diseases of feeder lambs was undertaken at the urgent request, through their veterinarians, of the owners of some 10,000 head of western lambs in two groups that were being fattened for market. One group was on a ration consisting of screenings, mill oats, and pea silage; the other on grain and clover hay. These lambs were bought in Montana, but no deaths occurred until they had been in the feed-lots for about five weeks. As a preventive measure, they were injected with hemorrhagic septicemia bacterin, about one week after their arrival.

The first specimens for examination were brought in on November 14, 1923, by Dr. C. F. Hannemann, of the Wright Veterinary Hospital, Columbus, Wisconisn. These were from the carcass of a lamb belonging to a lot owned by the Columbus Canning Company. It was one of forty that had died in about ten days.

Symptoms: The attending veterinarian stated that death occurred in most of these lambs before the onset of any noticeable symptoms.

Postmortem findings: Hemorrhagic areas varying in size from a pin-point to three inches in diameter and irregular in outline were observed in the musculature. The muscle underneath the scapula, along the back, and in the flank showed the most pronounced lesions. The kidneys showed a marked degenerative hemorrhagic infiltration A few petechiae were noted on the heart and spleen. Some inflammation of the mucous membrane of the gastro-intestinal tract, especially that of the fourth compartment of the stomach, was also noted. These lesions were typical of all postmortems held.

Animal inoculation studies: In order to aid in establishing the diagnosis, a rabbit and a guinea pig were injected subcutaneously with 1 cc of the muscle-juice from the lamb mentioned

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above. The guinea pig died in about 18 hours, but the rabbit remained in good health. Microscopically, an organism that resembled blackleg was found in the tissues of the guinea pig.

On December 26, 1923, an apparently normal lamb was procured for the purpose of demonstrating the virulence of the anaerobe in question. On December 27, at 9:30 a. m., 5 cc of a live 24-hour broth culture were injected into the muscles of the right hip. The temperature reactions of this lamb are shown in table I.

TABLE I—*Temperature reactions of inoculated lamb.*

12–27				12–28	
A. M.		P. M.		A. M	P. M.
9:30	11:30	2:00	5:00	9:30	4:30
102.0	103.2	104.4	104.0	104.4	105.0

At 4:30 p. m., December 27, this lamb was noticeably lame in the left foreleg and otherwise not as active. On December 29, at 7:30 a. m., it was found in a comatose condition, so was killed for study. Postmortem lesions were as follows: marked hemorrhagic infiltration at the point of inoculation; hemorrhagic areas ranging in size up to four inches in diameter were found in the muscles along the back and under the left scapula. The kidneys were both somewhat inflamed, but not noticeably degenerated.

Bacteriological investigations: The organism found in pure culture in three different lambs was an anaerobe. It was also recovered from the experimentally infected lamb mentioned above. Microscopically, the similarity of this pathogen to that of blackleg was striking. Animal inoculation further bore out the resemblance, in that guinea pigs would succumb uniformly while rabbits were not susceptible (except with very large amounts of inoculum).

Microscopic examination of smears from the surface of the livers of guinea pigs, however, revealed an organism markedly dissimilar to that of blackleg. Furthermore, growth on some of the rare sugars revealed other striking differences (table II). We definitely classified this organism as *Clostridium oedematis maligni* (*Vibrion septique*).

Preventive measures: Because of the resemblance to blackleg of cattle, blackleg filtrate was used on a part of these lambs, but it did not stop the progress of the disease. As lambs in this flock continued to die, it was decided to make a filtrate for immunizing purposes, using the organism isolated from carcasses

TABLE II—*Growth characteristics and fermentation reactions*

Surface of liver (guinea pig)	Organisms in chains
Dextrose agar (2%)	Growth
Deep beef-liver agar (2%)	Colonies fluffy; much gas
Deep liver broth	Organisms settle out
Lactose	Acid and gas
Mannite	Acid and gas
Saccharose	Acid
Salicin	Acid and gas
Glucose	Acdi and gas
Maltose	Acid and gas
Dextrin	Acid
Proteolysis	Negative

of lambs belonging to the flock. Accordingly, enough for 1,250 lambs was prepared in the Veterinary Science laboratory.

Method of preparing filtrate: Meat infusion broth was prepared in the usual manner and adjusted to a pH of 8. One-liter Florence flasks were used. A minimum surface exposure was obtained by filling the flasks full enough so that the broth came up into the neck. After sterilization they were cooled down to about 55 degrees C. and inoculated, the inoculum being deposited in the bottom of the flask with a long pipette.

In order to test the potency and purity of the filtrate, three guinea pigs were given 5-cc doses subcutaneously on January 5, 1924. On January 17, these three guinea pigs were given 1 cc of a broth culture of the organism subcutaneously, and two control guinea pigs were given 0.1 cc of the same culture. The m.l.d. of this culture was approximately 0.1 cc.

The two control animals died promptly, while the three inoculated animals remained in good health. To test the purity of this product further, one ram and three rabbits were injected intramuscularly with 15 and 10 cc. None of the animals reacted to this treatment. Cultural tests showed that the product was bacteriologically sterile.

After the administration of this filtrate to susceptible lambs by Dr. L. A. Wright, he reported as follows: The entire flock was vaccinated with this product, which seemingly checked further losses.

SUMMARY AND CONCLUSIONS

1. A fatal disease of lambs on two farms was observed.
2. Most affected lambs died without showing noticeable symptoms.
3. These two flocks of lambs were on farms several miles apart and on dissimilar rations.

4. Postmortem lesions were septicemic in nature with a marked involvement of the musculature.

5. Bacteriologic examination of specimens from three different lambs revealed a pathogenic anaerobe, *Clostridium oedematis maligni* (*Vibrion septique*).

6. Animal inoculation proved this organism pathogenic for lambs and guinea pigs, but rabbits were very resistant.

7. A filtrate made from this *Clostridium oedematis maligni* (*Vibrion septique*) culture was successful in preventing the disease in guinea pigs.

8. This filtrate also gave satisfactory results as an immunizing product for lambs, although we do not consider the field results as conclusive.

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A Big Difference

Mose—Yas, suh; mah boy Ebenezer was a veterinarian ob de big war.

Josh—Go long. Whut yuh tryin' to use dat big word on me foh? You mean he was a veteran—a plain, common veteran, just like my boy Shadrach.

Mose—Nuffin ob de sort. Mah boy was a veterinarian, I tells yuh. He was in de hoss-docterin' branch. He wasn't no plain, common veteran; no suh!

What's in a Name

"Doc." said he, "if there is anything the matter with me, don't frighten me half to death by giving it a scientific name. Just tell what it is in plain English."

"Well," said the doctor, "to be frank with you, you are just plain lazy."

"Thank you, doctor," sighed the patient with relief. "Now give me a scientific name for it, so I can go home and tell the missus."

Changed His Mind

"Ah, you have a dog. I thought you didn't like dogs."

"Well, I don't. But my wife picked up a lot of dog soap at a bargain sale."

WATER BUTTS AND STONE BUTTS*

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Investigation of the poultry markets in connection with the control of fowl plague has aroused the interest of poultry dealers in troubles of a disease nature among their birds. Dr. C. O. Neuhaus, Agent-in-Charge of the Philadelphia District for the Pennsylvania Bureau of Animal Industry, brought to our laboratory fowls affected with what they termed "water butts" and "stone butts."

A "water butt" is a chicken with an enlarged abdomen which, on palpation, is soft, fluctuating, and of the nature of abdominal ascites. A "stone butt" is a chicken with an enlarged abdomen which, on palpation, is quite hard, feels full, sometimes lumpy and in which shelled eggs, broken eggs, or degenerated eggs may be outlined. Examination of these birds shows them to be going light, somewhat anemic, and showing a poor state of nutrition.

Autopsy discloses in the "water butts" a distension of the abdominal cavity with peritoneal fluid, peritoneal exudate or degenerated egg yolks. Some contain a large quantity of such material. In one "water butt," we found a normal left ovary and oviduct. The right oviduct was thickened and enormously distended with a clear, watery fluid. Eleven hundred cubic centimeters of fluid was measured out of this oviduct.

A "stone butt" contains a ruptured oviduct, with many degenerated yolks of varying size, which have dried or which have been pressed into layers. Occasionally, there are a number of eggs with shells which have accumulated in the oviduct or in the peritoneal cavity, and quite often are broken.

Such chickens are from lots of old chickens sent alive to the market for slaughter. They no doubt are sent to market because they are not producing eggs. They cause considerable loss, because they do not yield a satisfactory carcass.

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VETERINARY PROPHYLAXIS OF MEDITERRANEAN FEVER*

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Mediterranean fever, often called also Malta fever, is a chronic malady which, under natural conditions and in a characteristically morbid form, is observed only in man. It is characterized clinically by intermittent febrile exacerbations which recur at less and less frequent intervals. This periodic variation causes the thermal curve to assume a sinuous trace, which has given to Mediterranean fever the name of undulant fever by which it is sometimes designated.

The febrile attacks of the first period are accompanied by profuse sweats, which rapidly cause loss of flesh and profound asthenia. In this first phase of the malady clinical diagnosis is practically impossible. In the meantime definite morbid lesions such as pain in the articulations and tendons localized in the region of the tarsus, orchitis, parotitis and gingivitis appear later and, although regarded separately, these symptoms may be of little significance; by their grouping they acquire diagnostic value which permits us finally to recognize the nature of the affection.

The mortality is not great according to reported morbidity; its toll is scarcely more than 5 per cent. The gravity of Malta fever consists principally in its interminable duration, its clinical duration frequently being extended over periods of two, three, and even four years.

Mediterranean fever is caused by a microbe discovered in 1887 by the English military physician, Bruce, in the spleen and the blood of several patients who had succumbed to the malady. Mistaking its real form, Bruce named the agent of Mediterranean fever *Micrococcus melitensis*, a name now fixed by use.

In 1897 the English bacteriologist, Wright, showed that the serum of individuals affected with Malta fever agglutinated

*Communication in the Bulletin de la Société Centrale de Médicine Vétérinaire.

Bruce's microbe and upon this reaction he founded a method of diagnosis which, in the absence of pathognomonic symptoms, was generally used from that time on to diagnose the malady in the early stages.

In 1905 Zammit discovered the presence of *Micrococcus melitensis* in the goats of the island of Malta and, with the members of the Commission of the Royal Society[1] showed that the malady was transmitted by the use of the milk of these animals. The knowledge of the role by goats in the propagation of Mediterranean fever has laid the foundation for a rational prophylaxis permitting the assurance of the protection of man. Since the goats are the agents of the contamination, the prophylaxis of Mediterranean fever necessarily carries with it a veterinary aspect; it is this side of the question which is to be the principal object of this account.

Malta Its Birthplace

From Malta, which appears to be really its birthplace, Mediterranean fever spread in less than fifty years over the whole world. First it reached the islands and the shores of the Mediterranean. For a long time Tunis, Algeria, Spain and Italy have been infected. Mediterranean fever had invaded Greece, Turkey, the shore of Asia Minor, Egypt, Portugal, India, Morocco, South Africa, and has recently reached the American continent. It is to be remarked that, until the present, the malady has become prevalent only in countries that are comparatively warm. Its existence has never been mentioned beyond the parallel passing through the 45th degree of latitude north.

In continental France it is prevalent in the vast area extending over the region of the Causses and the Cevennes range, the lower valley of the Rhone and Provence, with a denser focus in the departments of Gard and Herault.

Along with the numerous epidemics occurring in this zone (Saint-Martial (1900) and Franquevaux (1910), in the Gard; Saint-Bauzille de Montmel (1910), in the Herault; the neighborhood of Saint-Afrique (1910), in the Aveyron; Bruc-Auriac (1911), in the Var, etc.,) grouped or sporadic cases have been observed frequently in our territory but in the isolated cases an indigenous origin is not generally recognized.

[1]The English authorities of Malta had instituted, under the patronage of the Royal Society of London, a commission charged with studying Mediterranean fever which was raging in the island with extreme intensity. Presided over by Bruce, this commission, of which V. H. Horrocks, Eyre, McNaught, E. A. Shaw, Crawford-Kennedy and T. Zammit were members, pursued its researches from 1904 to 1906 and published a series of remarkable treatises to which we owe the most essential part of our knowledge of Malta fever.

We have no exact knowledge of the extension of Mediterranean fever in France these last years. However, one has the impression that here as elsewhere the malady has not ceased to progress and to gain ground. Doubtless it would be an exaggeration to assert that Malta fever represents today a very alarming peril for our country; nevertheless it is possible to think that this affection may constitute tomorrow a danger full of menace, since according to the suggestive expression of Ch. Nicolle, Mediterranean fever appears as a malady of the future. One must therefore think from now on of the means by which, when the moment comes, it would be fitting to bar the way. In the first rank among these means are naturally the measures capable of stopping the diffusion of the infection in goats and eventually in other animals.

It is well known that in prophylaxis it is sometimes perilous to postpone intervention until the contagion is entrenched in a territory. It is certain that the sanitary measures will have a greater chance of being efficacious if they are undertaken earlier. Moreover, it is necessary to know *how* to intervene. In fact one can combat advantageously the invasion of a contagious malady only if one recognizes it in all its manifestations, and it must be admitted that, if Mediterranean fever in man is well known, we are practically ignorant concerning the *Micrococcus melitensis* infection of animals, which represents, however, the source of the contagion to man. And this is why, to the question, *"Can we now be ready to undertake a rational struggle against the melitensis infection of goats?"* one is obliged to answer frankly, "No!" In order to be convinced, it is enough to cast a glance upon the present state of the question.

Symptoms Absent in the Goat

One fact upon which all authors agree and which ought immediately to be emphasized, is that generally the infectious state created by *Micrococcus melitensis* in the goat and other animals comes about silently and is not betrayed by any morbid symptom. It is interesting to note that, without the existence of Mediterranean fever, which it causes in man, the infection of the goat would probably never have been suspected. It should be mentioned also that, from the purely veterinary point of view, the *melitensis* of the goat has practically no interest and that the question of its prophylaxis is not brought up except in as far as it is associated with the prophylaxis of Mediterranean fever . . . . useless to add human, since, as has just been said, there

does not exist, properly speaking, animal Mediterranean fever.

But, someone will say, since the *Micrococcus melitensis* infection of the goat is not revealed by any clinical symptom, how has anyone been able, how is anyone able to recognize its existence? Theoretically, by research and the recognition of the *Micrococcus melitensis* in the organism and the animals in question. Practically, by the agglutination test of the microbe of Bruce, effected with the serum (or the milk) of these animals.

One may remark in passing that the degree of confidence which it is possible to grant to the experimental procedures of diagnosis varies greatly according to whether it is a question of their corroborating a suspicion already born of clinical investigation or of constituting, as is the case here, the only convincing argument. In this last case, it is fitting to be particularly circumspect. So it is not futile to face, first of all, the question of the value of the evidence furnished by the diagnostic procedures which have been indicated.

Identification of Organism Difficult

The finding of the specific microbe directly isolated from the organism should not bring with it, it appears, the least uncertainty. Without doubt, but this is always on the condition that the identification of the germ is easy. But this is not the case. The *Micrococcus melitensis* is a variety of microbe which does not have marked characteristics and it may be said that it is characterized only by a collection of negative characters the value of which is not of the first order. Bruce's germ is in fact a non-motile microbe which does not take the Gram stain, which does not ferment sugars, which does not liquefy gelatin, which does not coagulate milk and which does not produce indol. It is easily seen how delicate the determination of such a germ must be and one can hardly avoid the suspicion that a number of microbes coming from animal organisms have perhaps been labelled melitensis without sufficient foundation. In reality the identification of the *Micrococcus melitensis* can be made readily only by using specific agglutinating serum and it will be seen later what must be thought of this procedure in this connection today.

Moreover, it is only in rare cases that the microbe of Bruce has been sought in animals with a view to diagnosis. It may be said that all the history of the *Micrococcus melitensis* infection of the goat, as well as of other animals, rests upon one single

criterion—that which is furnished by the agglutinating properties of the serum of the individuals in question. But what is this evidence worth?

When one examines closely the numerous publications of which the seroagglutination of Wright has been the subject, one is confounded by the confusion which reigns. First of all, it must be stated that it is practically impossible to compare the various documents since all the authors who have taken up the question have, so to speak, inaugurated a personal technic. Without attempting long dissertations upon the subject, we will limit ourselves to saying that the variations of the agglutinating power of the serums coming from normal subjects, in different species of animals in response to the *Micrococcus melitensis*, have never been the object of a systematic determination. Thus certain authors have considered as a sign of the infection in the goat an agglutinating power manifesting itself at 1-20, when it has been established by the works of L. Negre, confirmed by the statements of other authors, that one can find goats certainly not affected whose serum is shown to agglutinate at one one-fiftieth and even at one one-hundredth. The researches of Martel, Tanon and Chrétien have proved, on the other hand, that the value of the agglutination of *M. melitensis* by the serum in goats was not to be depended upon because they showed that the injection of cultures of the typhoid bacillus or of staphylococci caused in these animals a strong agglutinating power for the microbe of Bruce.

Agglutination Widely Interpreted

Under these conditions can one be astonished at the divergence of opinion among different authors regarding the interpretation which should be given to the agglutinations obtained by the aid of the serum of the goat? A certain author considers that a sero-agglutination produced at 1-20 is sufficient to affirm the diagnosis of melitensis infection, another wishes the serum to act at least at 1-40, another demands that the reaction be effected at 1-250, a last declares finally that it is impossible to make a positive diagnosis unless agglutination occurs at 1-500. The already low value could be accorded to evidence based upon seroagglutination that has recently been diminished by the knowledge that there is a very intimate relationship between the microbe of Mediterranean fever and the *Bacillus abortus* of Bang, responsible for the epi-

zootic abortion of cattle. The inevitable confusion between these two germs clouds in reality many data which had been recorded under the title of melitensis.

Perhaps it appears surprising that the resemblance between the microbe of Bruce, known since 1887, and the microbe of Bang, discovered in 1896, has not impressed bacteriologists until twenty-two years later. Necessarily the reasons must be looked for in the known circumstances formerly surrounding the identification of the *Micrococcus melitensis*. In fact it was only in 1918 that Miss Alice G. Evans, pursuing the identification of a microbe found in the milk of the cow, described the numerous points of resemblance which exist between the agent of Mediterranean fever and the bacillus of abortion of cattle. The researches carried out by numerous authors (Meyer and Shaw, Feusier and Meyer, Zeller, Khaled, Fleischner, Vecki, Skaric, Bevan, Burnet) who have studied the two microbes comparatively, not only confirm their relationship, but even attest their complete analogy. In the first place both placed in the species Brucella, created for their benefit, the *Bacillus abortus* and the *Micrococcus melitensis* have just recently been united by Burnet in a unique bacterial species.

Malta Fever and Abortion Organisms Alike

It is established from now on that the morphologic characters, the peculiarities of the cultures, the biologic properties and the antigens of the agents of Mediterranean fever and of epizootic abortion of cattle are identical. The differentiation of these germs by bacteriologic methods is then impossible, and even the agglutinating reaction is powerless to assure a distinction between them.

Neither do the effects produced in laboratory animals by inoculation with cultures permit the establishment of a definite separation between the microbic branches. If the *Bacillus abortus* is generally more virulent for the guinea pig and less for the monkey than is common for the *Micrococcus melitensis*, that is a question only of quantitative differences effaced by the individual variations of the pathogenic power which the different samples of these microbes can present.

In the future, in the presence of a germ derived from an animal organism, one is going to find it absolutely impossible to say whether it is a microbe belonging to the branch of Mediterranean fever or to that of epizootic abortion.

The contagious abortion of domestic animals affects principally the bovine species but it is observed frequently also in the females of other domestic animals, and the goat is not spared. The vulnerability of goats with regard to the bacillus of epizootic abortion is furnished by the fact that the experimental study of *Bacillus abortus* has been in large part pursued in these animals.

As will be seen later, abortion is an occurrence which is observed frequently in goats infected with *Micrococcus melitensis*. Moreover, the animals affected with true epizootic abortion do not present, aside from the abortion which is not an episodic fact, any characteristic morbid sign. Consequently we do not possess any clinical means permitting us to differentiate the two types of infection. Moreover, neither the reactions of agglutination, as has been said, nor the reactions of allergy are capable of serving for differential diganosis.

As the epizootic abortion of live stock is an affection which is extremely widespread, there is no reason to suppose that it is not manifested where Mediterranean fever reigns. If, then, one wished to be scientifically exact, it would be necessary to declare that there is no certainty regarding what constituted, until very recently, the epidemiology of melitensis in animals.

However there remain the observed facts.

B. Abortus Not Pathogenic for Man

The microbe of epizootic abortion does not appear at all pathogenic for man, for the Mediterranean fever is totally unknown in the countries where the stock is very gravely infected by the *Bacillus abortus*, as England, Canada, certain regions of the United States, the Scandinavian countries, etc. There exists, then, between the *Micrococcus melitensis* and the *Bacillus abortus* this categorical demarcation, that the first is very virulent for man, the second totally inoffensive.

But the question is then to know whether the *Micrococcus melitensis* may not be simply a strain of *Bacillus abortus* having acquired a pathogenic power for man either by brisk mutation or by slow adaptation and because of influences with which we are not at present acquainted, in passing through the organism of the goat. The acquisition of the special virulent quality can very well depend upon the nature of the medium where the virus grows and it is permissible to evoke in favor of this hypothesis the experimental results obtained by Dujardin-Baumetz with the microbe of peripneumonia.

Maintained in a nutritive medium with the addition of beef or rabbit serum, the microbe of peripneumonia remains virulent for cattle and indifferent for sheep; cultivated in the same medium with the addition of sheep serum, it remains virulent for cattle and becomes pathogenic for the sheep; cultivated in the same medium with the addition of horse serum, it loses its virulence for cattle and retains its virulence for sheep. But this problem raises a question of doctrine which cannot be discussed at length here. It suffices to have shown that the hypothesis of the transformation of Bang's microbe into Bruce's microbe is not unbelievable and to indicate that if this supposition should be demonstrated by facts or experiment, the conditions of the veterinary prophylaxis of Mediterranean fever, such as it can be conceived at present, would be completely upset.

In a subject where so many facts, which formerly appeared certain, are now doubtful, one notion remains incontestable. It is that in Malta fever there is recognized almost always as the cause, under natural conditions, a contamination of animal origin. The numerous observations which establish this point are supported by an indirect demonstration which has the value of a proof.

M. Melitensis Dangerous to Handle

The *Micrococcus melitensis* is excessively dangerous to handle and we have ceased to count the examples of contaminations taking place in the laboratory through the manipulation of cultures of this microbe. Even in pushing to excess the minute precautions which form the foundation of bacteriologic technic, it is extremely rare that the bacteriologists who study the microbe of Malta fever avoid the infection. The malady contracted in such special conditions develops exactly as does the natural Mediterranean fever, but these laboratory infections are never the point of departure of an epidemic focus and one does not observe the contamination even of persons living in the immediate vicinity of the sick. It is then quite certain that the inter-human contagion, direct or indirect, plays only a modest role, if any at all, in the transmission of Mediterranean fever.

The assembled facts which have established the role of goat's milk in the epidemiology of Mediterranean fever remain just as convincing as on the first day. These documents are briefly recalled here.

In 1904 Zammit, having acquired in Malta a lot of six native

goats upon which, through lack of monkeys, he proposed to experiment, was surprised to find that the serum of five of these animals possessed a marked agglutinating power toward the *M. melitensis*. Pursuing his investigations, he recognized that these five goats harbored Bruce's microbe in their milk. This was the ray of light which suddenly illuminated the pathogenesis, until then obscure, of the malady.

The researches very soon revealed that the goats of the island were gravely contaminated. Horrocks and Kennedy, examining 331 goats coming from different localities of Malta, found 138 of which the serum agglutinated the *M. melitensis*. It was found, moreover, that the centers where there was the greatest proportion of infected goats coincided exactly with those where Mediterranean fever raged with the greatest frequency in the inhabitants. Thus, at Rabato, a little village which had suffered greatly through the fever, there were 342 goats, of which at least 15 per cent were contaminated. In a village where no Malta fever in man existed, on the contrary, not an infected goat was discovered.

The marine hospital of Bighi, built under remarkable sanitary conditions, nevertheless enjoyed an unenviable reputation for the facilities with which the sailors sent there contracted Mediterranean fever at the very moment when they were cured of the illness which had sent them there. Shaw tested the 91 goats which furnished milk to this establishment; 30 showed a positive sero-agglutination and, in nine, melitensis existed in the milk.

Monkey Susceptible to Malta Fever

As early as 1905 Horrocks and Kennedy had shown that the monkey could be infected experimentally by ingestion of milk to which had been added a culture of *M. melitensis*. These experiments, resumed the following year by Eyre, McNaught, Kennedy and Zammit, proved that monkeys could be infected by giving them milk coming from goats naturally contaminated. Also, as early as 1906 Bruce, summing up the facts acquired by the Commission upon the subject of the pathogenesis of Malta fever, could already write, "There is little doubt that Mediterranean fever is given to man through the milk of the goat."

The belief of the transmission of Malta fever by the use of goats' milk rested upon such persuasive arguments, it threw such a dazzling light upon epidemiological phenomena until then inexplicable, that it was accepted immediately. From that

moment, in a case of Mediterranean fever, medical research was guided by the order, "Look for the goat!" This adage was so well executed that the reading of certain observations published since then leaves the impression that the facts have often been, if not denatured, at least so interpreted as to be able to give as the cause the milk of the goat which ought to guarantee the authenticity of the diagnosis of Malta fever.

Moreover, confirmations came in from all sides. At Gibraltar, in South Africa, in India, in Algeria, in Tunis, in southern Italy, everywhere finally where endemic centers of Malta fever had become established, there were found infected goats. In Algeria, the existence of Mediterranean fever, suspected since 1895, had been demonstrated in 1904 by Gillot. A search undertaken in 1907 by Edm. Sergent, Gillot and Lemoine brought out the fact that the goats of the colony were contaminated.

After Malta the colony of Tunis constituted the most important center of infection of the Mediterranean coast. The investigation led by Ch. Nicolle and Conseil, in 1908, showed that the milk goats of the city of Tunis, most of them of Maltese origin, were largely affected. Moreover, in Tunis as in Algiers, there was noted a remarkable agreement between the distribution of the cases of Malta fever in the inhabitants and the distribution of the herds of infected goats in the different quarters of these cities.

Malta Fever Spread by Goats' Milk

About the same time Clayton, a physician of the English navy, reported a very convincing example of transmission of Malta fever to man through the milk of the goat. It is the story, now a classic, of the American steamer, Joshua Nicholson. This boat had taken on, at La Valette, a lot of 61 Maltese goats, bought for the Bureau of Animal Industry of Washington. These animals were to be carried to Anvers, then transported to New York by another steamer. The crew of the Joshua Nicholson, composed of 33 men, had received permission to drink the milk of the goats on board. After the transfer of the animals, during the second part of the voyage, five goats died and, upon arriving at New York, the sanitary authorities of the port placed the survivors in quarantine It was discovered at this time that 32 goats had a serum agglutinating the *M. melitensis*. A woman servant of the quarantine station, who in the meantime had taken milk from these goats, contracted typical Malta fever. Then they

tried to find out what had become of the sailors of the Joshua Nicholson. Among the twelve men of whom it was possible to find traces in Anvers, eight said that they had had attacks of fever. In five of them the sero-agglutination test permitted the recognition, when it was too late, of Mediterranean fever. Of the four members of the crew not affected, two did not like goats' milk and the other two had drunk it only after having it boiled.

A certain proof of the role of goats' milk in the propagation of Mediterranean fever was furnished by the demonstration of the efficacy of prophylactic measures based upon this idea. As soon as the danger was known, the naval authorities of Malta replaced the milk coming from the native goats with condensed milk and the troops were forbidden to drink milk before having it boiled. The effect counted upon was not long awaited. Some months after the adoption of this measure the forces of Malta found themselves totally free from an affection to which they had been paying, until that time, a tribute amounting annually to nearly 80,000 days in the hospital.

The danger of goats' milk was so thoroughly admitted that, thanks to the suspicion created by the presence of imported goats in an establishment, Würtz, in 1908, was able to diagnose correctly the first cases of Malta fever observed in France. It was a question of an amateur who had started a model goat farm in the department of Seine-et-Marne. Goats from Switzerland, Nubia and Spain had been assembled in this establishment. The Spanish goats, coming from the region of Murcia, fell sick and contaminated about twenty of the animals. A short time after the owner and his gardener were taken with an affection having the general appearance of an atypical typhoid fever, but this diagnosis was contradicted by the Widal reaction, which was negative. It was only at the end of three months of uncertainty that Würtz, whose attention had been attracted by the sickness of the goats, suggested the idea that it must be a question of Malta fever. This hypothesis was verified by the Wright reaction, which was positive, not only with the serum of the two patients, but also with the serum of the three goats which had recovered. However, it must be stated that in the account published by Danlos, Würtz and Tanon there is no mention made of the two patients drinking the milk of the suspected goats. It is to be noted also that Rossignol, who had examined the goats, had reported strongylosis of the abomasum as the cause of the trouble observed.

Other Animals May Spread Infection

The observations which from this date succeeded each other in France without interruption showed very soon that if the transmission of Mediterranean fever through the milk of the goat remains the rule in the masses of the city, other causes may intervene in the propagation of the malady, notably in rural establishments. Emanating from the goat other products than the milk can assure the contamination and, along with the goat, other domestic animals can constitute sources of contagion.

As early as 1907 the researches made in Algeria by Ed. Sergent and L. Bories, on a slight epidemic of Mediterranean fever, observed in the village of Kléber (Oran), had revealed that, of nine patients, six had taken only boiled goats' milk and two had never drunk any. After the epidemic which raged in Saint-Martial (Gard), in 1909, of which Cantaloube had the distinction of recognizing the nature, 91 patients only out of 144 had drunk raw goats' milk. For forty of those affected one could, in default of milk, incriminate the use of goat cheeses, but there yet remained thirteen others who had never taken either milk or cheese. In the epidemic observed in 1910 at Franquevaux (Gard), Dubois stated that of fourteen patients there were seven who did not drink milk and did not take cheese made from goats' milk. The same year an epidemic broke out in the neighborhood of Saint-Afrique (Aveyron), upon an isolated farm where no goat had lived for several years. Darbois and Vergnes recognized that the flock of ewes kept on this establishment were infected but none of the seven men who successively contracted Malta fever had drunk their milk. For the four cases of Mediterranean fever observed in 1909 and 1910 at Longueval (Somme) by Maxuré, the goats, either by their milk or by their cheese, could not be blamed. The epidemic observed at Brue-Auriac (Var), in 1911, by Rouslacroix, Lieutier and Sivan, attacked about twenty people but only half of them drank goats' milk. Cazeneuve reports the observation of four persons contaminated at Saint-Girons (Ariège) by a travelling flock of milk goats; the first person affected, the innkeeper who sheltered the flock, never drank milk. In 1915 Edm. Sergent, L. Nègre and L. Bories made researches concerning an epidemic of undulant fever at Arzew and at Saint-Leu (Oran); they recognized that at least in two patients out of seventeen, it was impossible to attribute the contamination to the ingestion of raw milk or of fresh goats' cheese.

Disease Observed Among Butchers

Among the numerous isolated cases of Mediterranean fever observed, in immune regions, in individuals never having had any sort of relation with contaminated countries, the greater part (case of Gouget, two cases of Auclair and Braun, several cases of Mollard, new case of Gouget, Agasse-Lafont and Weil) concern butchers' employes. This occupational predisposition is certainly not accidental and must result from risks of infection peculiar to the work in the abattoirs, but, whatever these risks may be, the eventuality of contamination by ingestion of milk cannot be retained.

That the ingestion of raw milk or of fresh goats' cheese constitutes the customary method of transmission of Mediterranean fever to man it is difficult to deny, but it is none the less true that the propagation of the malady can be brought about by other means. Moreover, it is logical enough to foresee that the method of contagion which keeps the infection among adult goats, where the ingestion of milk certainly does not figure, ought also to intervene in the contamination of man and of the different species of animals sensitive to the melitensis virus.

The question of the avenues of entrance that the melitensis virus takes to penetrate the organism has been the object of numerous experimental researches.

Disease Follows Subcutaneous Inoculation

Bruce and Hugues have shown that the subcutaneous inoculation of a small dose of pure culture of *M. melitensis* in the monkey (*Macacus sinicus*) determines in this animal an infection which, when it is not rapidly mortal, affects a course recalling very nearly the Mediterranean fever of man, especially in what concerns the characteristic undulant manner of the temperature curve.

In 1905 Horrocks undertook the study of the experimental infection of the monkey. Dry dust wet with cultures of *M. melitensis* was spread in a cage occupied by one of these animals. The subject succumbled at the end of thirty days and the *M. melitensis* was recovered in his spleen. Another monkey received the dust by insufflation through the nose; he also contracted a mortal illness.

A monkey which took potatoes sprinkled with cultures of *M. melitensis* was infected also. Then a new monkey whose cage was situated between two others occupied by sick monkeys took

the disease naturally, and the circumstances under which the infection was brought about make one think that the cause of the contagion resided in the urine of the neighboring monkeys.

In 1907 E. A. Shaw took up these experiments with the aim of determining the different possibilities of infection capable of explaining the natural methods of contamination. Dust sprinkled with a culture of *M. melitensis* was spread in a cage containing two monkeys; neither of the two contracted the illness, but by insufflation dust infected two monkeys out of three. Deposited in the conjunctival cul-de-sac, the dust thus contaminated provoked the infection of two monkeys out of four. On the contrary, dust dampened with virulent urine was insufflated by four monkeys without the infection becoming established.

A new monkey was placed in contact with an infected monkey in a cage so arranged as to avoid the possibility of contagion through the urine by means of mosquitoes. Under these conditions cohabitation can be prolonged without its resulting in contamination. If one suppresses the measures taken to prevent the transmission of the malady by means of the urine, the infection of the new subject takes place within a short time.

The contamination of the monkeys is realized without fail when a trace of *M. melitensis* is placed in direct contact with mucous membranes. Two monkeys were infected by instillation of the culture upon the conjunctiva, one by introduction in the trachea, another by deposit in the nostril.

Insects as Vectors of Malta Fever

A great number of experiments have been conducted to elucidate the question of the transmission of Malta fever by means of mosquitoes and stinging flies. Zammit obtained success with *Stegomyia fasciata*, Kennedy obtained transmission with *Culex pipiens*, but the positive trials remained quite exceptional, while a great number of trials ended in failure. In fact it appears well established that if the propagation of Malta fever by mosquitoes or stinging flies is theoretically possible, the importance of this factor of dissemination of the malady is practically negligible. It is the same as for the possibilities of contamination through the ectoparasites: lice, fleas and bedbugs.

The transmission of the infection through the digestive mucosa is easily realized. In 1905 Horrocks and Kennedy had shown that one can infect monkeys by having them take virulent goats' milk. These experiments were completed the following year by

Eyre, MacNaught, Kennedy and Zammit. These authors, in most of their trials, succeeded in communicating Malta fever to the monkey by ingestion of naturally or artificially infected milk. The infection was shown, when it was not rapidly mortal, by the appearance of a specific agglutinating power in the serum. Usually the *M. melitensis* was found in the spleen or the mesenteric ganglia of the subjects under experiment.

The penetration of the microbe appears to occur in the antegastric part of the alimentary tube, because the introduction of virulent products directly into the stomach with the aid of an esophageal tube has no effect.

The trials of Shaw ended in similar results. Monkeys which took potatoes soiled with dust dampened with urine of sick animals were infected two times out of three.

The absorption of the virus can come about also from the genital mucosa. Eyre, McNaught, Kennedy and Zammit state that a monkey in which one has placed virulent urine upon the mucosa of the glans penis manifests signs of infection shortly afterward.

Edm. Sergent, in 1907, states that the contact of *M. melitensis* with the external mucosa, even without abrasion, is, next to subcutaneous inoculation, the easiest method of infection. By keeping monkeys for only twenty-four hours in a contaminated cage, this author obtained three infections in four animals submitted to the test. The trials of contamination through the digestive tract gave the same results, but the dose of virus introduced was much greater than that which sufficed in the first experiment to contaminate the victims through the external mucosa alone exposed to contagion.

From these facts it follows that the contagion can occur in a great variety of ways. In fact the conditions which control the transmission of the infection vary according to the surroundings.

Interhuman Transmission Negligible

The part played by interhuman contamination in the transmission of Mediterranean fever should be counted negligible. It cannot be doubted from this point of view that the infection of young infants may occur through the milk of wet nurses infected with Malta fever, and the possibility of contagion by sexual intercourse in adults should be recognized.

These are eventualities presenting no epidemiological importance. As for contaminations of animal origin which manifestly play the principal role in the dissemination of Malta fever, it

appears quite certain that, in cities and in persons having no direct contact with animals, milk represents the source of contagion which must almost always be blamed. Here infection is brought about by the ingestion of raw milk used on the premises —and in this case it is almost only goats' milk which is in question —where the infection occurs upon the very spot, or at a distance, by means of fresh cheese prepared from the milk of infected goats or sheep in which Bruce's microbe can remain alive and virulent during a week or more.

On the contrary, with cases of Malta fever observed in rural districts in individuals who, by the nature of their occupations, are directly in contact with the infected animals, the origin of the contamination must often be looked for in an inoculation through an abrasion on the hands or through the external mucosa, by means of milk or of matter contaminated by urine, rather than in the ingestion of milk or cheese. Persons employed to milk infected goats or sheep are particularly exposed. In the establishment where the epidemic of Mediterranean fever reported by Darbois and Vergnes raged, the milking of the sheep was done only by men; seven of the domestics charged with this task were contaminated, while no woman was affected. In Corsica the milking is habitually performed by women, so Marcel Léger and Dominici-Urbani attest, after the epidemic of 1911, that the twenty-six persons affected included eighteen women and eight men, and that among these eight men, five sometimes helped in the milking of the goats.

The relative frequency of Malta fever among butchers must doubtless be referable to the risks of cutaneous infection from the blood or viscera of the infected goats or sheep which the workmen have to handle in the abattoirs.

Most Epidemics in Rural Districts

It is worthy of remark that almost all the epidemics of Malta fever mentioned in France have appeared in rural districts, that is to say, under circumstances where the chances of contamination through direct contact with the infected animals, the bedding and manure contaminated with urine, appear to take precedence over the chances of contamination through the use of milk or cheese.

In contaminated areas or in regions temporarily supplied with goats' milk, the precaution of having the milk coming from these parts boiled doubtless constitutes an indispensable measure of

protection, but it appears clear that this cannot be considered as an infallible means of prevention In principle, the general prophylaxis of Mediterranean fever ought to go beyond the milk. It ought also to look further than the goat.

Just as all species of domestic animals are sensitive to the *B. abortus*, so they appear also to be receptive to the *Micrococcus melitensis*. The experiments of Eyre, of O'Connor, of Ch. Nicolle and of E. Burnet seem to show in fact that the infection can be communicated to cattle, horses, sheep, dogs, cats, rabbits, guinea pigs, mice, and chickens by inoculation with cultures of the microbe of Mediterranean fever. However, it must not be forgotten that many of these tests are not absolutely conclusive, for very often the only proof of the infection is the appearance of the agglutinating power on the serum of the animals inoculated, an effect which could be obtained just as well by the injection of dead microbes in a receptive organism as of virulent microbes in a refractory organism. The certainty concerning the infection in the guinea pig and rabbit should make experimental infection of other species very possible. However nothing positive is known concerning the aptitude of these species of animals to contract the infection under natural conditions. In fact nothing can be conjectured from the results furnished by the agglutination of the *Micrococcus melitensis* which, in themselves not very significant, are moreover not at all conclusive, since they could just as well result, as has been said, from an infection caused by the *Bacillus abortus*. Neither can the isolation of the microbe bring any certainty, the fact being that, besides the contamination of man, there is no way of distinguishing the microbe of Bruce from that of Bang.

The statements of Shaw, at Malta; of Horrocks, at Gibraltar; of Spagnolio and Signer, at Messina, referring to the agglutinating power of the serum of numerous cows, or to the presence in their milk of a microbe analogous to the *M. melitensis*, do not then have any significance. It is even certain that the agglutinating power which Kennedy observed in cows in London, in regard to the microbe of Bruce, was really owing to the existence in these animals of epizootic abortion.

Transmission Through Cows' Milk Not Proved

The transmission of Malta fever to man, through the use of cows' milk, has never been proved beyond question. The observations made by Bevan, in Rhodesia, raise the question without answering it.

As for the horse, the arguments which can be given to sustain the possibility of natural infection would perhaps have more value, for the presence of the bacillus of Bang is more exceptional in this animal than in bovines. Kennedy, examining the serum of 87 mules, at Malta, finds 37 the serum of which agglutinates feebly the *M. melitensis*, and two of which the agglutinating power is higher than 40. In Sicily the existence of a feeble agglutinating power of the serum has been established in regard to the microbe of Mediterranean fever in 20 per cent of the horses examined. Of nine mules imported in this island, three manifest, at the end of six months, an agglutinating power higher than 200. Edm. Sergent and Bories try the experiment of Wright in 27 horses and mules upon the infected farms after the epidemic observed by these authors at Kléber (Oran) in 1907; three serums agglutinate at 1-30 and two at 1-200. At Franquevaux, Dubois points out also two positive sero-agglutinations obtained in the horse.

An observation made at Kléber, by Sergent and Bories, has suggested the idea that the mule could serve as the agent of contamination. Two young men, one an Alsatian and the other Spanish, living in separate quarters and not associating with each other, never drinking raw goats' milk, contracted Malta fever, one after the other. Both had been employed, one after the other, by the same farmer and had cared for the horses and the mules. One of the mules had a serum with a very high agglutinating power. The two patients, during their stay at the farm, had daily cared for this mule and had never been in contact with the goats.

Disease Observed in Sheep

In sheep the existence of an infection occasioned by the M. *melitensis*, of which the probability could be foreseen, because of their relationship with goats, has been established by the observation of Darbois and Vergnes. The epidemic observed by these authors upon an isolated farm of Aveyron, where there were no goats, could have been spread only by the sheep of the flock, of which 49 out of 429 had an agglutinating serum. At Saint-Martial, Aubert, Cantaloube and Thibault had already remarked that seven sheep, out of 74 examined, presented a positive sero-agglutination, and at Franquevaux, on one single farm which had twelve sheep, Dubois found six whose serum agglutinated the *M. melitensis*. Lagriffoul, Arnal and Roger had determined,

after the epidemic of Saint Bauzille-de-Montmel, that the sheep had played the role of infecting agents as much if not more than the goats.

In contaminated areas the dogs and cats are perhaps also exposed to the contagion, but most of the arguments supporting this supposition, based upon agglutination, are discredited by the determination of an agglutinating power going as high as 600, made by G. Vallet and Rimbaud in normal dogs. In the meantime, in Malta, Kennedy, who had found an absolutely positive sero-agglutination in nine dogs out of 114 examined, could isolate the *M. melitensis* from the mesenteric ganglia in one case. Likewise Shaw claims to have isolated from a mesenteric ganglion the microbe of Bruce in a cat, out of five which had shown a positive Wright reaction among the 22 submitted to the test.

The rabbit appears susceptible to natural infection, although proof of the fact is lacking. At Saint-Martial, Aubert, Cantaloube and Thomas, looking for sero-agglutination in the animals kept in the living quarters of patients, found a positive reaction in 18 rabbits out of 83. At Kléber, Sejournant discovered a rabbit whose serum agglutinated, in a house where there had been sick persons for five years.

The receptivity of the guinea pig to the spontaneous infection is demonstrated by the observations made at Tunis. After the first researches in Tunis, Ch. Nicolle and Conseil looked for the agglutinating power of the serum in twenty guinea pigs kept in stables sheltering infected goats; in one the serum agglutinated the *M. melitensis* at 1-20, in a second at 1-40, and in another at 1-300; the microbe of Bruce was isolated from the spleen of this last. Burnet found the *M. melitensis* in an articulation and the lymphatic ganglia in an infected guinea pig in his home quarters.

Pathogenicity for Poultry in Doubt

It has been asserted that poultry could be contaminated upon infected farms. The observations cited in support of this affirmation are not of the most convincing. At Messina, Fiorentini, studying an epizootic which raged in a chicken-house, states that there was a positive sero-agglutination for *M. melitensis* in four hens of the nine which were sick; on the contrary, in the 35 healthy hens the reaction was negative. The microbe of Bruce was found in the spleen of one sick hen. At Franquevaux upon three infected farms, Dubois observed four positive reactions

in eleven hens submitted to the test. From March to June, 1910, the same author, working with a very deadly epizootic which raged among the fowls in an establishment in the suburb of Nimes where the sheep were infected, records a positive sero-agglutination in three hens out of eight examined and in five chickens out of nine. On the same farm two ducks out of seven tested, and one rabbit out of six furnished a reaction which was feebly positive. Nevertheless the *M. melitensis* has never been isolated from the blood and the organs in dead subjects and very serious doubts persist as to the real nature of this epizootic which claimed 140 victims from a total of 205 hens. Dubois himself seems to have abandoned the hypothesis of a melitensis infection. The infection of poultry, supposing that it exists, does not appear to occasion losses in the countries most seriously tried by Mediterranean fever.

Decidedly the inventory of our knowledge of the melitensis infection in the different species of animals shows that there is no great certainty about the subject, some probabilities, a great many inexactnesses. However we should consider it quite possible that, besides the goat and the sheep which are surely receptive, most of the mammals and perhaps also the birds are susceptible to the melitensis under natural conditions and can be capable of serving as agents of contamination for other animals and for man.

However that may be, among domestic animals the goat is beyond question the one which is the most frequently affected and it seems that every time that a melitensis invasion has been observed in species less exposed, as the sheep, the circumstances of the contamination made it possible to trace it to a caprine origin. Moreover, it is to be remarked that the spread of Mediterranean fever has passively followed the geographic dispersion of goats from the island of Malta.

Goat the Natural Reservoir

The goat constitutes then beyond doubt the natural reservoir where the melitensis virus is maintained. There is every reason to think that if we succeeded in suppressing the melitensis infection in the goat, we should at the same time dry up the spring which nourishes the Mediterranean fever of man.

It is in order to attain this object more easily that the greater part of the authors who have treated the question of the prophylaxis of Mediterranean fever, Edm. Sergent, Dubois, Ray-

baud, Porcher, and recently the Academy of Medicine itself, have proposed to inscribe Mediterranean fever of the goat in the list of animal maladies counted contagious by the law of June 21, 1898.

Can it be hoped that the possibilities of action opened by the dispositions of the rural code relative to the sanitary police of animals should permit the stamping out of the melitensis infection of the goat? This appears, considered more closely, to be extremely doubtful.

The means that may be employed to prevent the contamination of goats by the *M. melitensis* and to extinguish the centres of infection already constituted depend upon two sorts of intervention, on the one hand, the employment of appropriate measures of sanitary police; on the other hand, the immunization of receptive animals. Let us consider what, in the actual state of affairs, it would be reasonable to expect from both.

Before examining the sanitary police measures which could be repressive to the melitensis of goats, it is necessary to state in a few words the conception which one must form at this time of the evolution of this infectious state in the goat according to the meager information furnished by observation, the most important facts contributed by experimental study, and the comparison which may be drawn with the contagious abortion of stock.

Habitually the *M. melitensis* is installed in the infected goats as an inoffensive guest; it is lodged preferably within certain organs, such as the udder, the spleen, the kidney, a lymphatic ganglion, or some tissue such as the bone marrow, and vegetates in these foci without, as a general thing, any apparent lesion. But from time to time the activity of these latent centers is awakened and the germs multiply and are spread in the blood. The microbes are generally eliminated from the organism through the milk in females in lactation and through the urine in the kid, the pregnant goat and in the buck.

Goats Act as Carriers

In the infected goats neither the titre of the agglutinating power nor the results of the hemocultures and of the successive lactocultures are constant (Et. Burnet). It seems that the goats which harbor the microbe of Mediterranean fever in their organisms do not succeed in ridding themselves of it. Zammit declares that he has never seen the infectious state created by the microbe of Bruce in the goat disappear spontaneously. The animal, he

says, may be in good condition and possess all the evidences of health and its serum may have lost all agglutinating power, but if the animal is slaughtered, the *Micrococcus melitensis* is always found hidden in an organ or a ganglion. At the autopsy of nine goats which had been infected for more than fifteen months, Zammit succeeded in showing the microbe of Bruce by culture in six cases. A goat in which there had been no sign of infection for two years and which would have been considered as cured, furnished, after parturition, a milk full of the microbes of Mediterranean fever.

Spread through the urine of infected animals, the *M. melitensis* is found abundantly disseminated in the contaminated centers.

Various experiments show that the microbes disseminated in the exterior surroundings offer a long resistance to the natural causes of destruction. If the *M. melitensis*, directly exposed to the sun, perishes in a few hours (Horrocks), it remains alive for a week in diffused light and survives more than fifteen days in darkness (Zammit). Horrocks has observed that, dried upon slides, it conserved its vitality for sixteen days, upon sand for twenty days, and upon cloth for eighty days. In damp manure it persisted only seven days but it was found alive twenty days in ordinary manure, and after sixty-nine days in dry manure. Gilmour noted a conservation of forty-two days in garden earth. In tap water the *M. melitensis* can be kept alive for thirty-seven days (Shaw). In the dust of the Maltese soil it is found still in a state to develop at the end of forty-three days. The microbe can be conserved as long as seven weeks in the urine (Shaw).

The infection produced in goats by the *M. melitensis* can proceed from a human origin as well as from an animal origin.

It is known how common the custom is in the country to urinate in the stable. Any person affected with Mediterranean fever can then constitute a source of contagion for animals, since in man the kidney constitutes the habitual emunctuary of the microbe of Bruce.

Nevertheless it seems possible that the propagation of the infection in the goat comes about expecially through interanimal contagion. The germs emitted with the urine can soil the forage and infect the goats through the digestive tract, or be spread upon the soil and the bedding and thus assure the contamination through the external mucosa or through inoculation upon cutaneous excoriations. Upon an infected farm the risks of contagion

for goats and other animals which are easily affected are certainly many and permanent.

Disease Spread by Milkers

Milking appears to constitute a frequent method of contamination for milk goats and sheep, the milkers serving as agents of inoculation by transporting with their hands to the udders of healthy animals the virulent microbes gathered with milk of infected females.

Coitus probably represents also a common means of infection, the contaminated buck appearing capable of transmitting the infection directly to the goats which are brought to him and which will go immediately to carry the germs to the different farms. Dubois has published observations on this which appear conclusive. However, it is recognized today that in the epizootic abortion of stock, the diffusion of the infection by the male is far from playing the primordial role which was first assigned to it.

Even if contamination did not result from the infecting coitus, the breeding season of goats could still be regarded as dangerous because of the assembling of animals from different sources.

According to Dubois, the kids born of infected mothers enjoy a certain resistance and are not as a rule contaminated by drinking their mothers' milk. On the contrary, the kids born of healthy mothers might be infected by drinking the milk of infected goats and they would then be apt to propagate the infection by sucking healthy females. A. Connor has claimed to have accomplished experimentally the infection of lambs nourished with milk from sheep inoculated with the *M. melitensis*, but the reading of his observations leaves some doubt upon the subject.

After what has just been said one feels that when the melitensis infection is found on a farm, it has every chance of perpetuating itself there because of the facility of contamination, of the dissemination of infectious germs in the exterior surroundings, of their persistent vitality outside of the organism, of the numerous animal species susceptible to contracting the infection and spreading the contagion, of the very long duration of the infection in affected individuals, and finally of the absence of natural immunization in young subjects coming from infected mothers.

Disease Difficult to Control

It can be seen also how difficult it will be, under these conditions, to extinguish the centers of infection established. Equally

it will be guessed how hard it will be to prevent the propagation of the infection in healthy animals living near contaminated goats.

When one tries to imagine how, as regards melitensis in goats, the sanitary intervention of the law of June 21, 1898, could be applied, one sees only difficulties of execution. As to the results that one could legitimately count upon from the practice of the measures of sanitary police, even the most severe, one must agree that they appear quite uncertain.

In the first place, how suspect the contaminated herds? How recognize the infected goats? Whence will emanate the declaration which shall initiate sanitary action?

A sign perhaps capabe of causing suspicion that the goat is infected with the *Micrococcus melitensis* is repeated abortion in a herd or in a region. In France the abortion of goats or of sheep has been, in fact, mentioned in the greater part of the epidemics of Mediterranean fever which have been the subject of an account.

In February, 1909, Malta fever made its appearance in the village and the outlying hamlets of Saint-Martial (Gard); since January, 63 goats of the 164 in the country had aborted although presenting no signs of illness. Among these 63 goats, 44 were later recognized as infected. At Franquevaux the epidemic of Mediterranean fever had likewise been preceded by an epidemic of abortions in the goats of the locality. After the epidemic observed by Darbois and Vergnes in the neighborhood of Saint-Afrique, 80 sheep of the 500 comprising the flock had aborted in January, three weeks before the manifestation of the first cases of Mediterranean fever in the workmen who did the milking. At Brue-Auriac the epidemic made its appearance early in the spring of 1911 and, since the preceding fall, 6 goats out of the 16 in the herd of the commune had aborted. In Corsica, a little while before the first cases of Malta fever were observed at Ersa, Rogliano and Centuri, the communal herder had been surprised by the great number of abortions (about 50 per cent) occurring in his herd of goats.

Abortions in Malta Are Rare

But if abortion constitutes a prodromic sign of melitensis infection, how explain that this accident should hardly ever be noted in Malta, in Tunis and in Algeria, exactly where the goats are infected in great numbers? Perhaps we should think that abortion is produced only in females infected for only a short

time, as is true to a certain degree for the contagious abortion of stock. Thus it could be understood why, in the countries very seriously affected, the goats infected for a long time before arriving at adult age can give birth normally.

Moreover, abortion, an inconstant occurrence, can be occasioned by various causes. It is only when abortions appear very frequently in a herd or in a district that they constitute a warning to which it is prudent to pay attention. The suspicion thus created can in reality come from an infection by *B. abortus*, but there is no occasion to stop at this eventuality, since there is no criterion permitting the establishment of a differential diagnosis.

Other symptoms have been pointed out incidentally by different authors—thinness, lameness, keratitis, mammitis, abscess of the udder, modifications of the secretion of milk—but their commonplaceness takes away all diagnostic significance, and it is even difficult to consider them as serious signs of suspicion.

After the epidemic of Cape Corsica, Marcel Léger and Dominici-Urbani stated that of thirteen aborting goats, only eight showed a positive sero-agglutination and, of seven non-aborting goats, two nevertheless had an agglutinating serum. A goat affected with kerato-conjunctivitis showed a positive Wright reaction; a goat affected with lameness gave a negative reaction. Finally, of five goats appearing perfectly well upon clinical examination, three had an agglutinating serum.

In the course of their researches regarding the presence of *M. melitensis* in the goats of Tunis, Ch. Nicolle and Conseil found six samples of milk containing the microbe of Bruce. Three of these milks were normal in appearance, two were watery, another was thick, like condensed milk. The goats which furnished the milk had sometimes an abundant secretion, sometimes diminished, sometimes almost dried up.

Temperatures of Infected Goats

Concerning the variations of temperature in infected goats, there is very little information. Et. Burnet says: For seven days we were able to take the temperature of one goat, at a time when the agglutinating power was 500 and where three lacto-cultures were positive (hemocultures negative). The milk contained a great quantity of white globules and was poor in lactose. During these seven days the temperature remained between 36.3° and 36.9°. We possess another tracing of forty-seven days, from March 17 to May 3. Hemoculture negative, March 11 and

18; positive, April 13. Lactocultures positive March 11 and 17. Agglutinating power over 200. On the temperature tracing we see only three points at 39, 39.1, 39.2°C., April 2, 7 and 11; the remainder of the tracing remains between 38.2° and 38.9°C.

It is to be noted moreover that the autopsy of the infected goats shows no characteristic lesion.

Impossible to determine by clinical examination, the diagnosis of melitensis infection in the goat demands then the collaboration of experimental methods, but it is already known that these will be powerless to furnish an unequivocal answer, since the identity existing between the microbe of Bruce and that of Bang creates an irreducible ambiguity. If one wishes to enter the struggle, one must inevitably consent to treat with the same rigor both the goats dangerously infected with the *M. melitensis* and the goats, inoffensive for man, infected with the *B. abortus*.

The experimental procedures to which, under these conditions, it would be possible to have recourse are not all practicable. Thus it is that the use of microbian extracts, melitin or abortin, substances comparable to tuberculin and capable of revealing the infections caused by the two germs in question, cannot be used in the goat because, contrary to what takes place in man and the guinea pig, the specific reaction does not appear in this animal (Et. Burnet). On the other hand, searching for the microbe in the blood, the milk or the urine of suspected goats, by direct culture or inoculation of the guinea pig, can be of no help, for the aseptic technic demanded is impracticable except in the laboratory. Besides, this procedure could give only tardy and inexact answers, positive results alone being susceptible to interpretation.

Although hardly answering to the conditions of rapidity and of simplicity which are demanded by the applications made in rural districts, the agglutination method is the only one which can be used with profit. But with how many precautions should it be used, with how many reserves judged!

Standardization of Tests Desirable

Without summing up the process again here, it may be useful to state the principal guarantees which it would be necessary to give to the agglutination test in order that some faith may be placed in its indications. It would be fitting, first of all, to determine a uniform technic, to "standardize" Wright's reaction, to emp'oy the expression in vogue, and to determine the varia-

tions of the agglutinating power of the serums of the different species of animals, in their normal state as well as in pathologic condition, as regards radical tests of the different antigen types of the *M. melitensis* (or rather of the *B. abortus*, less dangerous to handle). The results obtained hitherto hardly encourage us to believe that the agglutination test, even if correctly carried out, will permit the arrival at a sure diagnosis. Usually the reaction will simply indicate probability, much more certain in the positive cases than in the negative cases. Finally, what can be expected of agglutination is especially that it will furnish a statistical appreciation as to the state of infection of a herd, but it seems vain to hope that the method can serve to draw an unquestionable line between the infected individuals and the sound animals. It should not be forgotten that the *M. melitensis* has been isolated from the milk of goats whose serum agglutinated only at 1-20 (Sergent, Gillot and Lemaire) and that Boycoll and Damant found in London, among 22 goats kept at the Lister Institute and certainly exempt from melitensis infection, three goats whose serum agglutinated at 1-20 and two others whose serum agglutinated at 1-200.

Decidedly it is possible that the melitensis infection of goats, clinically undiscoverable, may be suspected according to the results of the agglutination, but there can be no reason for putting this test in practice unless there is a previous suspicion of the existence of Malta fever in persons whom the goats in question may have contaminated. *Declaration*, the basis of veterinary intervention, not being able to result directly from the recognition of the state of infection in the goats, must necessarily be provoked by the existence of Mediterranean fever in man and consequently emanate from the doctor.

But this difficulty having been overcome, it remains to determine the measures which appear proper to overcome the contagion. The prophylactic rules must evidently be applied to all animals capable of carrying and spreading the virus. Besides goats and sheep, as we have already seen, very little is known of the ability of the different species of animals to contract the melitensis infection. If the regime adopted looks only to the goat, interanimal contagion runs the risk of being kept up between the other domestic species capable of carrying the microbe of Bruce. If the measures are applied to all species of domestic animals, their efficacy will perhaps be greater, but shall

we be sure of reaching all the sources of contagion? What is the role of rats, mice and birds in the dissemination of the germs?

Man May Spread Disease to Goats

It is known that a man having Mediterranean fever can also be an active agent of propagation of the infection in animals. Persons having Malta fever should, because of this fact, be submitted to certain obligations. It is easily foreseen how difficult it will be to impose restraints upon the patients of an infected farm, especially if these measures must be observed during the whole period of convalesence. It must not be forgotten that cases have been mentioned where Mediterraneans still had the *M. melintensis* in their urine during the eighth month of their illness Also one must remember that Shaw, in La Valette, found the microbe of Bruce in the urine of nine dockers, apparently healthy, among 525 individuals examined in this regard.

As regards the suspected goats, it is difficult to think of any practical method of ending the dissemination of the contagion other than slaughter, since in these animals the infection lasts for years. Moreover, this measure would not be more expensive than sequestration if it were merely the business of the owners, but it goes without saying that, as the melitensis infection does not endanger the life of the goats affected, in justice slaughter ought to bring indemnity, which might constitute a very heavy burden for the state.

And when such a radical system had been applied, would the contagion be surely stopped? Who would dare affirm this? Unless the stables remained empty for a very long time, it appears extremely probable that the new goats introduced in the farm would run a great risk of being contaminated in their turn, either by rodents, by large domestic animals, or by man.

Sanitary police control of the caprine melitensis infection appears to be vexatious and onerous, very probably impracticable.

As yet no mention has been made of the difficulties of application. The putting into practice of a sanitary regime based upon these principles would demand an organization which we lack. We must not forget that, in the contaminated regions, milk goats should be constantly watched if reliable control is desired. Besides the uncertainty of the results furnished by sero-agglutination, one must remember the variation of the agglutinating power in the goats actually infected. Burnet, examining at Tunis at intervals of six months a herd of 450 goats, found 25 which

reacted positively to the second test after they had not reacted to the first, and 20 which, having furnished at first a positive, later furnish a negative reaction, a change which we know cannot be laid to the cure of the affected goats.

But the most convincing argument which one can give to show the inefficacy of the methods of sanitary police, destined to combat the melitensis infection in goats, is the experiment performed on the island of Malta.

Five Per Cent of Goats Infected

In Malta a sanitary regime based upon the slaughter of goats condemned by the agglutination test, and carrying with it the compensation of the owners, was instituted several years ago. Intervention was exercised with the strictness which the English authorities use in these matters, but the results obtained are far from corresponding with the importance of the sacrifices permitted. The sanitary personnel succeeded in examining scarcely 6000 goats a year of the 20,000 upon the island. The proportion of goats recognized as infected is practically the same, about 5 per cent, and Mediterranean fever continues to rage among the civil population with an intensity which does not decrease.

The immunization of the receptive animals would represent beyond all doubt, if it were realizable, the ideal means of prophylaxis. Unfortunately the greater part of the trials made heretofore to vaccinate the goats has ended only in failure (Eyre, Zammit, Ch. Nicolle). Vincent and Collignon have, it is true, made experiments which appeared to be crowned with success, but the results stated by these authors have not been confirmed and the scholars best qualified as to melitensis agree today in recognizing that the vaccination of goats cannot be obtained by the general procedures of active immunization at present known. The goat, says Ch. Nicolle, appears at the same time nearly indifferent to infection and refractory to immunization. The difficulty that is encountered in vaccinating the goat against the *M. melitensis* should not surprise us, for it is a well-known principle that it is infinitely easier to immunize against an acute, than against a chronic infection. Moreover, it is known that the refractory state created by vaccination is the fact of the reaction of the organism against the aggression of the virus-vaccine; since it has been said that the melitensis virus does not determine in the goat any appreciable reaction.

Vaccination Against Abortion

The problem of the vaccination of cattle against epizootic abortion, it is true, is considered solved, but on this occasion it is not a question of a true vaccination and the animals treated are not in any way immunized as regards the *B. abortus*. In reality the intervention brought about has as its only aim the prevention of abortion, and the injection of the specific bacilli provokes an effect analogous to that which in time would be produced by the natural evolution of the infection occasioned by the bacillus of Bang. Cows supposedly vaccinated do not abort, but they continue to carry in their milk living bacilli and remain contagious as regards new individuals.

As for anything connected with melitensis, the question is not put in the same way, and what we should attempt to obtain in the goat is a true vaccination, that is, the creation of a refractory state not permitting further vegetation of the *M. melitensis* in the organism of an individual treated. This problem is perhaps not insolvable, but we may say one thing—that it is not yet solved.

Perhaps the simplest means of protecting goats against the *M. melitensis* would be to inoculate them with the *B. abortus*, not as a virus-vaccine, but as an agent capable of preventing the multiplication of the *M. melitensis* by simple vital antagonism, unless, of course, the hypothesis stated at the beginning of this treatise is exact and the supposition is verified that the *B. abortus* can acquire, on passing through the organism of the goat, the quality of virulence for man, which causes it to be designated *melitensis*.

Finally, another chapter might very well be opened in the history of melitensis, that which relates to the chemotherapeutic treatment. It does not seem that very active researches have been effected in this direction where the solution of the problem of prophylaxis might very well be found.

Conclusions

The conclusion which is to be drawn from this long treatise can be formulated in a few lines.

Before thinking of inscribing melitensis of the goat in the list of maladies legally contagious, it appears necessary to pursue the experimental and epidemiological study of this infection, notably in all that concerns its relation with the epizootic abortion of cattle.

The veterinary prophylaxis of Mediterranean fever cannot be established upon a rational basis so long as we are not exactly informed as to the modality of the melitensis infection in the different species of animals, and no serious intervention can be undertaken before the conditions of experimental diagnosis be exactly stated. In the present state of knowledge it does not seem that we can count much upon the measures of sanitary police to end the melitensis infection in the goats kept in the contaminated regions.

It would be well to encourage the researches having to do with the specific and chemotherapeutic treatment of the melitensis infection, in order to be able to intervene more actively if the Mediterranean fever should be so spread as to justify more complete measures of protection than those which one must and can be content with at the present, and which may be summed up in these three propositions:

Boiling goats' milk taken in its natural state and sterilizing goats' milk destined for the preparation of cheese, in the regions of the South where Mediterranean fever exists in the endemic state.

Sanitary surveillance of travelling herds of milk goats coming from contaminated departments.

Forbidding the importation into France of animals of the caprine species coming from countries notoriously infected.

NEWS ITEMS

Veterinarians of the Animal Rescue League, of Boston, are reported recently to have separated five squirrels, which evidently had been joined at the tips of their tails since birth. The squirrels were discovered on a tree, each trying to go in a different direction. The tails were found to be braided virtually together. They were well nourished and strong. The operation is said to have been bloodless.

A cow, owned by a farmer living near Worthington, Indiana, is wearing an iron leg as the result of having broken one of her own. As she is a valuable animal, her leg was amputated by a veterinarian and replaced by the artificial one made by the local blacksmith. The report did not state whether the leg was a fore or hind one.

IMMUNITY AGAINST CANINE DISTEMPER

A Report of the Development of a New Immunizing Agent of High Efficiency

By Ashe Lockhart, J. D. Ray *and* J. S. Barbee

Kinsley Laboratories, Kansas City, Mo.

Canine distemper needs no introduction. It has been, for generations, the worst plague of canines and causes more grief for the small animal practitioner, kennel man, dog fancier, sportsman and fox raiser than any other disease.

For a number of years the authors have been engaged in experimental work, dealing with the cause and prevention of this disease. During our studies a large amount of data has been accumulated and in this report no attempt is made to give the details of the work done.

During the course of our experiments an agent has been discovered which has been given the name of Sero-Toxylin[1], and it is with this substance that this report deals. Sero-Toxylin is a new agent, being prepared from dogs, and consists of two injections, administered simultaneously.

Experiments have been carried out on an extensive scale to determine the true value and usefulness of Sero-Toxylin as a preventive against canine distemper, and a brief description of the experiments and results follows.

Early in this work it was found that the age of the dog had considerable influence on the results obtained in attempted immunization; consequently, the dogs of the experiment were divided into those more than three months old and those less than three months old.

Part I—Dogs More Than Three Months Old

In this experiment, thirteen groups of dogs, containing a total of 258 dogs between the ages of three and ten months, were obtained. All of these dogs were thought to be susceptible to distemper. This experiment was begun in September 1924, and has continued until the present time, June 1, 1925. All injections were made prior to Feb. 1, 1925.

Method of performing experiment: When a group of dogs was obtained, approximately two-thirds were injected with Sero-

[1]Patents pending on product and process. Received for publication, July 9, 1925.

Toxylin and one-third were left as controls. The dogs were injected as soon as possible after being received. Both the controls and treated dogs were placed in direct contact with dogs sick with canine distemper, the length of enforced exposure varying from a few days to several weeks and in some cases several months. Table I gives a summary of the results of this experiment.

TABLE I—*Results of immunization experiments*

	NUMBER OF DOGS	REMAINED HEALTHY AFTER EXPOSURE	DEVELOPED DISTEMPER AFTER EXPOSURE
Treated.....	166	163	3
Controls.....	92	11	81

From the above it will be seen that 88+ per cent of the controls developed distemper, whereas only 1.8 per cent of the treated dogs showed evidence of the disease. All dogs, both treated and controls, were observed for at least four months after exposure.

Duration of Immunity: Observations on a number of the above dogs have extended over a period of nine months, and they still resist exposure. Consequently the immunity should be considered as being permanent.

PART II—DOGS LESS THAN THREE MONTHS OLD

Experiments were conducted on five groups of puppies, less than three months of age. The work was done in exactly the same manner as in the first experiment.

TABLE II—*Results of immunization experiment on pups*

	NUMBER OF PUPS	REMAINED HEALTHY AFTER EXPOSURE	DEVELOPED DISTEMPER AFTER EXPOSURE
Treated.....	39	24	15
Controls.....	26	0	26

From table II it is seen that only 61.5 per cent of the treated puppies were protected against distemper, when treated before three months of age. However, it was observed that the disease did not appear in less than a month after treatment, whereas the controls developed the disease in from 10 to 15 days after exposure. Consequently, an additional experiment was conducted, the same as before, except that the treatment was repeated one month after the first injection. Where this was

done approximately 90 per cent of the treated puppies remained healthy throughout the experiment.

PART III—USE OF SERO-TOXYLIN IN KENNELS WHERE DISTEMPER IS PRESENT

While conducting the above experiments an opportunity was presented to test Sero-Toxylin in three kennels where a number of cases of distemper were present at the time of treatment, and where it was reasonable to suppose that all dogs were exposed before treatment. Only young dogs, of distemper age, were included in those observations. A total of 35 young dogs were treated, 16 being left as controls. There were 20 cases of distemper in the three kennels at the time of treatment. Of the 35 treated dogs, four developed distemper, all four showing symptoms of the disease within ten days after the treatment, and of the sixteen controls fourteen developed distemper. From this it will be seen that the progress of the outbreak was checked in the treated dogs, whereas it continued in the controls.

All of the above experiments were conducted prior to Feb. 1, 1925. Since that time several hundred additional dogs have been treated, and up to this time the results are practically the same as those given above.

Use in foxes: Investigations in this field have not been extensive but it seems that the agent is equally as effective in foxes as in dogs.

No curative value: A number of cases of distemper of various forms were treated with Sero-Toxylin without apparently influencing the course of the disease. Consequently, at this time, it should be said that the agent has little or no curative value.

CONCLUSIONS

1. Sero-Toxylin is a reliable immunizing agent, producing an immunity of long duration.
2. When it is necessary to treat puppies less than three months old, the treatment should be repeated in one month.
3. Sero-Toxylin is best used in unexposed dogs, but produces satisfactory results when used to combat the progress of a distemper outbreak in kennels where part of the dogs are sick at the time of treatment.

There is now no excuse for Munich (Germany) dogs going about dirty. A public bath for dogs has been established and is open daily from 8:30 a. m. to 7 p. m.

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

A CASE FOR DIAGNOSIS

By W. E. Watson, *Metamora, Ohio*

In November, 1923, I was called to remove the fetal membranes from what I would call a high-class Holstein heifer. I believe the man claimed she was almost a full-blood. She had aborted a seven-months calf, though she was pasture bred. She was one of four animals on the farm, and he claimed the neighbor's bull had got out, but he knew at just what time.

I removed the fetal membranes and the udder was very badly swollen. There did not seem to be so much udder but it was badly swollen in all four quarters. I treated her with magnesium sulphate and strychnin, and bathed the udder for an hour with hot water and the swelling disappeared entirely in thirty-six hours. In fact, there was not much udder left then. The owner was quite worried as to whether this heifer would come in milk. I advised him to keep milking her. He claimed the most milk he got at one time was one quart.

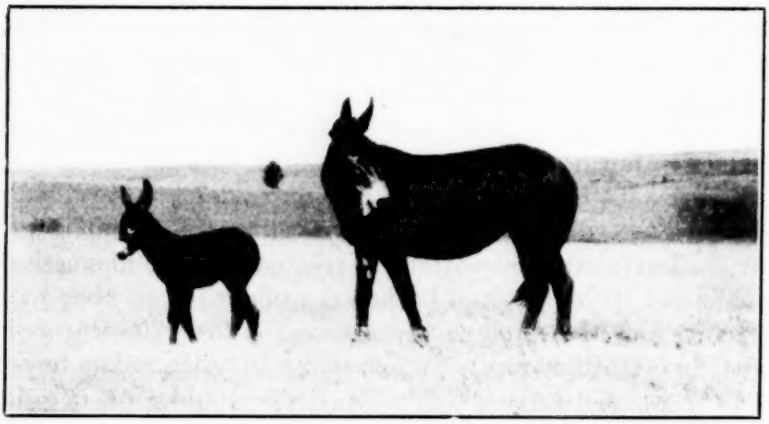
November 26, which was about ten days later, he called me about 10:30 at night. I do not know how long this cow was down, but he found her down on the cement floor with no bedding, lying in the angle of the floor and wall. When he met me, he said he did not think there was much use in my coming but he would like me to see her, thinking perhaps she had been poisoned. I did not know what the trouble was, but I had to do something, so I inflated the udder and followed that up with some stimulants. I could not get at the lower two teats very well and did not have help enough to roll her out, so I laid her out flat until I inflated the lower half of the udder. Then I gave her a half a grain of strychnin. In the morning she was on her feet eating, and I did not see her any more to treat her.

But the very peculiar thing about it was that he followed up the milking and in four weeks she was giving forty pounds of milk and increased to fifty-five pounds on her best day, which was about sixty days after she was down, or about seventy days after bearing the calf. She has since been well and is now about four months along in pregnancy.

A MULE AND HER PROGENY

By B. W. CONRAD, *Sabetha, Kans.*

The accompanying photograph shows a Molly mule and her colt, owned by Mr. James Powell, of Sabetha, Kansas. The offspring is from a jack, impregnation having taken place while out in pasture.



A mule and her colt.

Last fall it was my privilege to see the one at College Station, Texas, dam to three colts, but the sire being a horse. This being a departure from the normal, I thought it would be of interest.

NOSTALGIA OR INDIGESTION

Kookoosh, six-months-old Eskimo puppy, died the other day in New York. Veterinarian called it heart break, resulting from homesickness. A man started a frog ranch near Raymondsville, Tex., using 50 pairs of giant Louisiana "leopard" frogs as breeders. Soon he had 10,000. Returning home one night he says he found the road alive with frogs all jumping one way—toward Louisiana. Homesickness, he says. Plenty of evidence has been offered from time to time to indicate that animals sometimes do suffer from nostalgia. However, we feel sure that Kookoosh suffered more from improper diet and change of climate than a languishing for familiar scenery. As for the frogs—boy, page Ananias!—

(*Mattoon, Ill. Journal-Gazette.*)

REVIEW

REPORT OF THE TUBERCULIN COMMITTEE OF THE MEDICAL RESEARCH COUNCIL ON THE TUBERCULIN TEST IN CATTLE, WITH SPECIAL REFERENCE TO THE INTRADERMAL TEST, published in London, England, by His Majesty's Stationery Office, 1925 (Special Report Series, No. 94).

This is a minutely detailed report of tuberculin tests conducted in several herds of cattle, to find an explanation for alleged, anomalous results often obtained with tuberculin in herds producing "Certified" milk. Approximately two-thirds of the report consists of temperature and reaction tables and charts, and records of individual animals. The conclusions reached, briefly, may be summarized as follows: The subcutaneous test does not seem to be satisfactory unless it can be made under practically impossible, exacting conditions; the intradermal test is an accurate test for the presence of tuberculosis in cattle, and is superior to the subcutaneous, and the ophthalmic must be regarded as a subsidiary test.

The practical advantages of the intradermal test are summarized, but the commoner method of making it, injection into the skin of the tail, is criticised, and the modification worked out by Christiansen and Stub, in 1910, injection into a shaved area of skin on the side of the neck, and careful, caliper measurements of the thickness of the skin before and after injection, is recommended.

The injection of a sensitizing dose of tuberculin in making the intradermal test is discussed and approved. The two injections are made at the same point, from 24 to 48 hours apart, and, of course, the second injection is not required if a positive reaction is obtained with the first.

This double intradermal injection should be kept in mind in this country, when herds are tested in which repeated, periodic tests continue to show reactions, as it may have some value in detecting more or less advanced cases of tuberculosis and disseminators of tubercle bacilli that do not react with the tuberculin tests as they ordinarily are made.

The report presents evidence to show that neither the quantity or the chemical composition of the milk, or the temperature, appetite, or general health of cattle that are free from tuber-

losis is affected by diagnostic doses of tuberculin; it deals with standardization tests for and emphasizes the importance of the potency and purity of tuberculin, and it calls attention to the unreliability of tuberculin which has not been standardized. On the whole, it might be said, while this somewhat elaborate publication contains nothing really new, it merits that it should be read by those who are engaged in the campaign for the eradication of bovine tuberculosis.

E. C. S.

ABSTRACTS

ÜBER DIE TIERÄRZTLICHE AUSBILDUNG UND VERWANDTE FRAGEN IN DEN VEREINIGTEN STAATEN VON NORDAMERIKA (Veterinary Education and Similar Questions in the United States of America). W. Pfenninger. Schweizer Archiv für Tierheilkunde, lxvii (1925) 3.

The author refers to the publications on this subject by R. von Ostertag (1906) and Titze (1915), and compares educational conditions in the United States with those in Germany and Switzerland. He mentions, as one of the most striking differences, the existence, in the United States, of the private college. Another feature is the fact that preparatory training for entering the veterinary college in Germany is identical with that of physicians, whereas, in the United States, with some exceptions, the requirements are lower. Another difference arises from the fact that, in Switzerland and Germany, attendance at college lectures, after registration, is not supervised, but is a matter of individual choice and responsibility.

Lectures are not emphasized in the United States as they are in Germany, but practical training is preferred. Evidence of this attitude is the fact that sometimes assistant professors read very important lectures. The work in physiology and zoology is less comprehensive, but dairy hygiene is very well taught in the United States. In the various hospitals, individual training is very much emphasized. The publication of a dissertation is not required for a degree.

Veterinarians are everywhere kept very busy, but have difficulty in collecting fees because of the bad financial condition of the farmers. In proportion to the extent of the farming industry, the number of men in the veterinary profession is urprisingly small.

Veterinary medicine, in common with other medicine, suffers greatly from the practice of quacks and imposters. It is surprising that a people who submit to the restrictions of prohibition insist upon retaining liberty of choice as to who shall give them medical treatment.

Special mention is made of the research work of the Bureau of Animal Industry, under Dr. J. R. Mohler, and of the Rockefeller Institute, at Princeton, N. J.

The Americans are fully conscious of the far-reaching economic importance of veterinary research, and are more willing to make sacrifices and gifts in its behalf than are, for instance, the people of Switzerland. Europe has always looked with some contempt on American science, through lack of sufficient knowledge of conditions in the United States, and because the publications of medical science have not always been distinguished from those of quackery. Today, we must confess that there is a serious desire for research in the United States, and that, on this account, as well as because of the superiority, in many respects, of American equipment and the more favorable financial and political conditions, the leadership of Europe is being more and more endangered.

H. H.

FULDSTAENDIG TARMDESINFEKTION VED MELKESYRE (Complete Intestinal Disinfection by Lactic Acid). Ake Nordberg. Norsk Veterinaer-Tidsskrift, Oslo, ix (1924), pp. 274-275. Abst. from Sv. Veter. Tidsskr., No. 5, 1924.

Nordberg reports some results obtained by the use of lactic acid as an intestinal disinfectant and antiseptic. During an attack of appendicitis he took twelve grams of lactic acid (1.7 gm. per kg. of body weight) in about two per cent aqueous solution. The intense pains ceased and were at the time of the operation, six hours afterward, completely gone. No peritonitis was found at the time of operation and the first twenty-four hours following the operation were without pains. With much smaller doses he has obtained sterile intestinal contents and cessation of diarrhea. A brief mention is made of the work of others along this line. He then gives the results of some work done on animals at the slaughter-house in Stockholm. The experiments consisted of examinations of feces before and after, giving one gram of lactic acid per kg. of body weight in two per cent aqueous solution. In one case four million bacteria per cc were found before

the administration of lactic acid, while only sixty bacteria were found per cc twenty-four hours afterward. His tabulated results show that the lowest count is obtained between the twenty-fourth and twenty-seventh hours after giving the acid and that the bacteria have again increased markedly after forty-five hours.

H. J. S.

En "Steinach" Operation Paa en Okse (A "Steinach" Operation on a Bull). Hugo Heijbel. Norsk Veterinaer Tidsskrift, Oslo, ix (1924), pp. 275-276. Abst. from Sv. Veter. Tidsskr., No. 5, 1924.

A report is given on the indications for, the technic of and the results obtained by a "Steinach" or rejuvination operation on a bull. This bull had a great record as a sire and was sold at 5000 Swedish kroner, the highest price paid for an eleven-year old bull in Sweden. A short time after this sale the bull became sexually inactive. Veterinarian Björkman, Grönna, examined the semen twice and found the spermatozoa to be very inactive and fifty per cent below normal in numbers. After a while the animal became totally impotent. A "Steinach" operation was decided on and, September 25, the operation was performed by Heijbel, assisted by Björkman. The bull was thrown, given local anesthetic and after thorough cleaning and disinfection of the field of operation an incision six centimeters long was made through the neck of the scrotum, through which one of the vasa deferentia was ligated in two places, between which it was then cut off. The wound was sutured in the usual way. The bull was given a rest for two months. It is reported that the bull regained its former vigor and that examinations of the semen showed normal number and activity of the spermatozoa. According to Steinach, these results are due to an increased hormone-producing activity in Leydig's cells of the ligated testicle.

H. J. S.

Fakultativ Parasitisme av Eristalis-Larver Hos En Ko (Facultative Parasitism by Eristalis Larvae in a Cow). L. R. Natvig. Norsk Veterinaer-Tidsskrift, Oslo, xii (1924), pp. 348-356.

This is a report on a case of myiasis ventriculi in a cow caused by Eristalis larvae. A rather complete summary is given in English and a complete bibliography is appended.

H. J. S.

ARMY VETERINARY SERVICE

CHANGES RELATIVE TO VETERINARY OFFICERS

Regular Army

Captain Clell B. Perkins, V. C., is relieved from his present assignment as Assistant Professor of Military Science and Tactics at Ohio State University, Columbus, Ohio, effective on his return from temporary duty at summer training camp on or about August 10, 1925, and will then report to the Commanding Officer, Fort Benjamin Harrison, Indiana, for duty.

Captain Solon B. Renshaw, V. C., is relieved from duty as Assistant Professor of Military Science and Tactics at Iowa State College, and will report on or about August 31, 1925, to the Commanding Officer, Fort Meade, South Dakota, for duty.

Captain Louis L. Shook, V. C., is relieved from duty at the Army Veterinary School, and will report to the Surgeon General for duty as assistant to the Attending Veterinarian, Washington, D. C.

Captain Irby R. Pollard, V. C., orders amended: Ordered to Carlisle Barracks, Pa., for duty at Medical Field Service School as instructor in hippology and equitation, instead of Fort Sill, Oklahoma.

First Lieutenant Lester W. Ingram, V. C., is relieved from duty as transport veterinarian, U. S. Army Transport "Meigs," and will report to the Commanding Officer, Presidio of San Francisco, for duty on or about July 1, 1925.

Veterinary Reserve Corps

Additional Reserve Officers

First Lieutenants:
- Flora, Loren Clark.....South Dakota.
- Waldron, A. William.....215 Washington St., Tullahoma, Tenn.

Second Lieutenants:
- Hill, Verne Clifford.....308 E. Gaines, Monticello, Ark.
- Lee, Ward Royal,.....403 Livingston St., St. Paul, Minn.
- Steibing, C. C.....4520 7th St. NW, Washington, D. C.
- Redfearn, Ernest E.....37 Livingstone Ave., Pittsfield, Mass.

CHANGES IN STATUS

Separations

First Lieutenants:
- Boyer, Theodore R.....950 Pierce St., San Francisco, Calif.
- Ridley, Warren Frank.....Franklin, Ga.

Second Lieutenants:
- McAuliff, John Leon.....22 Pearne Ave., Cortland, New York.
- Roberts, Howard Franklin...4730 Gardena Ave., Pacific Beach, San Diego, Calif.

VIOLATORS PROSECUTED IN ARKANSAS

Dr. Joe H. Rux, state veterinarian of Arkansas, reports that Dr. C. D. Stubbs, of his department, recently succeeded in securing the conviction of Messrs. W. S. and W. C. Fairbanks, for advertising and using a so-called cure for anthrax, under the Veterinary Practice Act of the State of Arkansas. Fines of $50.00 each and costs were imposed. The defendants have appealed the case to the Circuit Court.

COMMUNICATIONS

PRESCRIBERS OR PEDDLERS

To the Editor:

I was very much interested in your editorial, "Prescribers or Peddlers," in the June issue of the Journal, as it recalled to mind an instance which occurred to myself a good many years ago; and although the cases may not be quite alike, I believe there is a certain similarity. I was approached by a proprietor of a certain liniment or embrocation, which seemed to have a pretty good sale in the South, for a prescription, as I thought, for another liniment which he, perhaps, imagined might prove a better seller than the one he had.

I asked him what he wanted the prescription for. To my surprise, he answered, "Oh, anything; it doesn't matter what, so long as your name is attached to it." I thanked him for his exalted opinion of me as a prescription-writer, but at the same time took occasion to say to him: "Mr. So-and-so, I believe I hold a pretty fair ethical standing in my profession. If I should accede to your request, and it should become known that I had done so, the chances are I would be ostracized by my professional brethren and lose whatever standing I may have." I then said to the party, who was absolutely sincere in his request: "Supposing you were in my position, then, what would you do under the circumstances? Would you sacrifice your professional standing for the remuneration you might expect to receive for the prescription, however large it might be; or would you refuse to give it and retain your standing in the profession?"

He immediately replied: "I never thought about the matter in that light before, but since you have explained the seriousness of the proposition, as affecting yourself professionally, I certainly would not think of asking you for the prescription, nor would I accept it if you offered it to me for nothing."

The point I desire to make is, that if the manufacturers of proprietaries, of whatever kind or variety, only knew or were informed of the seriousness of the professional man compromising his standing, not only in the profession, but among stock-owners as well, by handling their wares, commercially if you

will, they would probably think twice before placing such temptations in his way.

The party to whom I have referred evidently thought there was no breach of ethics to have one of his products endorsed by a member of the profession, until the matter was explained to him, when he saw the point right away.

Let us endeavor to retain and maintain whatever good standing we may have as a profession.

W. H. DALRYMPLE.

Baton Rouge, La., June 30, 1925.

A VISIT TO MEXICO

TO THE EDITOR:

On a recent business trip to Mexico City, in company with Dr. S. O. Fladness, I had the pleasure of visiting the National Veterinary College of Mexico and meeting Doctor Santa Maria, the director, and also the members of the veterinary faculty.

The National Veterinary School is nicely located just out from the business section of the city and near the National Military School. New buildings and equipment are being provided and, due to the active efforts of Dr. Santa Maria and his associates, the prospects for a fine veterinary school in our sister republic are excellent.

Dr. Fladness, veterinary inspector of the U. S. B. A. I., is stationed in Mexico and cooperating with the Mexican veterinary authorities in preventing the introduction into Mexico or the United States of transmissible animal diseases.

N. S. MAYO.

Chicago, Ill., July 1, 1925.

WHAT IS TIME TO A HORSE?

Dr. F. W. Main, of Albion, Mich., is responsible for the following:

> "I was called a few days ago by a man who was worried about a horse with a bad foot. He said, 'I haven't paid for him yet and I don't want him to die and then have to pay for him.' I asked him, 'When did you buy the horse?' He said, 'Two years ago this fall.' I made up my mind that I would not spend any money treating that horse this year."

ABOUT FACE

(From the Alexander, Ind., News)

C. C. Harrold, a well known veterinarian at Frankton, has disposed of the Frankton Garage and will devote his time to the veterinary business.

COMMENCEMENTS

UNIVERSITE DE MONTREAL

The School of Veterinary Medicine of the University of Montreal graduated five members of the senior class as the result of the examinations held on May 5, 1925:

J. W. Beriault
J. B. Besner
L. P. Jolicoeur
H. A. Rajotte
C. Rouleau

A prize for the greatest distinction in laboratory subjects was awarded to H. A. Rajotte. C. Rouleau was awarded a prize for the highest average in examinations.

CORNELL UNIVERSITY

The fifty-seventh annual Commencement of Cornell University took place June 15, 1925. Nine members of the graduating class received the degree of Doctor of Veterinary Medicine:

Dell Clare Bassett
Richard Vincent Gibbons
Walter Joseph Gibbons
Reuben Gordon
William Kemp Nugent
Paul Albert Raymond
Charles Cornelius Rife
Adalyn Flora Schoenfeld
Robert Herman Volgenau

The following received their degrees as of September 27, 1924:

Herbert Morris Cox
James Summer Marshall
Harold George Nelson
Milton Alson Nevens

The following prizes were awarded for the academic year 1924-25:

The Horace K. White Prizes
First Prize.....Walter Joseph Gibbons
Second Prize.....Richard Vincent Gibbons

The Hollingworth Honorarium.....Robert Herman Volgenau
Walter Joseph Gibbons

The James Gordon Bennett Prize.....Robert Herman Volgenau
Paul Albert Raymond

The Jane Miller Prizes:
First Prize.....Alexander Zeissig
Second Prize.....Andre Ray DeMott

IOWA STATE COLLEGE

Commencement exercises at the Iowa State College were held June 15, 1925. The Baccalaureate sermon was delivered by Bishop Edwin Hughes, and the Commencement address was given by Honorable John Hammill, Governor of Iowa.

In the Division of Veterinary Medicine, the degree of Doctor of Veterinary Medicine was conferred upon the following:

Filomeno Alagar
Ben Anderson
Norman H. Brinkman
Mack A. Emmerson
Glenn L. Hanson
Dale L. Hoag
Olene Jacobson
Harry S. Lames
A. W. Nyline
Clem Pierce
Ralph P. Reid
Louis E. Stanton
Odell K. Simonsen
Garabed M. Sinanian
Robert Spearing
H. Van Roekel
Edward H. White

Dean Stange reports that applications for men had been received to the extent of double the number of the graduating class. Dr. A. W. Nyline was the honor man of the class, having received the highest average of grades for four years. Dr. Van Roekel will take up post graduate work at the Virginia Polytechnic Institute. Dr. M. A. Emmerson is to remain at the Iowa State College to continue his studies along veterinary lines. The majority of the men, however, will go into general practice in Iowa and surrounding states.

OHIO STATE UNIVERSITY

The commencement exercises of the Ohio State University were held June 16, 1925, at the Coliseum, State Fair Grounds, Columbus. Twenty-nine graduates received the degree of Doctor of Veterinary Medicine, as follows:

Francis William Babb
Fred Joseph Badger
Lawrence Dean Barrett
Ralph Clyde Bunker
Joseph Delaws Cozzens
Oral Burl Curry
Joseph Druckerman
Clarence Benhard Erickson
Milton Reid Fisher
Harrie Earl Foster
Claude Adair Henley
Bruce Kester
Herman Joseph Kroger
Fernand Joseph Lizana
Everett Otis Lummis
William Francis Lyons
Floyd Alvin Mathew
Arthur Melvin Milliron
Neil Hayes Myers
Oscar Clay Richardson
Roy Joseph Rosselot
Lewis Ellis Schweizer
Roy Emmit Speck
George Oakley Shipley
Clarence Warden Sprowls
LeRoy Stauffer
Emmett Dwight Turner
Francis Lyle Vail
Frank Elmo Wesley

Of the twenty-nine who received degrees in veterinary medicine, seven R. O. T. C. students were granted commissions as second lieutenants in the Veterinary Reserve Corps of the United States Army.

MICHIGAN STATE COLLEGE

Commencement exercises were held at the Michigan State College, June 22, 1925. Ten members of the graduating class

received the degree of Doctor of Veterinary Medicine:

E. J. Ray Bates	Edwin P. Johnson
Edwin R. Carlson	Wm. Graham Kenney
Shwen Yuin Chen	Joseph S. Matteson
Harvey John Fiege	Frank E. Morgan
I. Forest Huddleson	Munro Sours

Walter F. Ball received his degree as of December, 1924; Howard Hilton as of March, 1925.

Mr. E. R. Carlson was placed on the honor list for having a high scholastic record during his four college years.

Mr. Harvey J. Fiege received the Michigan State Veterinary Medical Association prize for being the best senior in the class.

STATE COLLEGE OF WASHINGTON

Commencement exercises at the State College of Washington were held June 18, 1925. The following four graduates from the College of Veterinary Science received the degrees of Bachelor of Science and Doctor of Veterinary Medicine:

J. G. E. Campbell	Stanley Nevin
George R. Fowler	Cecil Vandermeer

These men also received their certificates from the Veterinary Medical Society of the State College of Washington, which is entirely a student organization, and is one in which the members work very diligently. These certificates are awarded to men who have done satisfactory work during their college career.

NEWS NOTES

An "alley cat," of uncertain ancestry has recently gained caste by becoming the foster mother to two valuable black silver foxes, on a farm near Benton Harbor, Mich. The cat mothered six kittens of her own while looking after her adopted charges.

A new form of "hold-up" appeared near Webster City, Iowa, recently. A stock train was flagged by a flare and, during the few minutes elapsing while the trainmen were investigating, four hogs were stolen from one of the cars. The loss was discovered when the brakemen noticed the door of a hog car open, two stations south. By wiring back to the point where the train had been stopped, they got on the trail of the thieves and recovered the hogs.

MISCELLANEOUS

JOHN SIMON GUGGENHEIM MEMORIAL FOUNDATION FELLOWSHIPS FOR ADVANCED STUDY ABROAD—1926

In order to improve the quality of education and the practice of the arts and professions in the United States, to foster research, and to provide for the cause of better international understanding, the former United States Senator and Mrs. Simon Guggenheim announce the establishment of the John Simon Guggenheim Memorial Fellowships or advanced study abroad. These Fellowships are established as an enduring memorial to John Simon Guggenheim, a son, who died April 26, 1922. The Foundation offers to promising scholars, both men and women, opportunities under the freest possible conditions to carry on advanced study and research in any field of knowledge, or opportunities for the development of unusual talent in any of the fine arts, including music.

1. It is the purpose of the Foundation after the first year to maintain annually from forty to fifty Fellows abroad. The Fellowships are intended for men and women of high intellectual and personal qualifications who have already demonstrated unusual capacity for productive scholarship or unusual artistic talent. The first general awards will be made for the academic year 1926-27.

2. Fellowships will be open to men or women, and to married or unmarried candidates. The Trustees prescribe no age limits; but appointees must be old enough to have shown decided ability in their particular subject. It is expected that ordinarily they will be not younger than 25 and not older than 35 years. The Fellowships will be open to citizens (or, in exceptional cases, to permanent residents who are not citizens) of the United States, irrespective of race, color or creed.

3. The stipend will in the normal case not exceed $2500 for a year of twelve months. The tenure of Fellowships will be adjusted to the purpose and scope of the studies of each individual. Appointments will be made ordinarily for one year, but plans which involve two or three years' study will be considered by the Trustees. In special cases the Trustees will grant Fellowships for shorter terms with appropriate stipends. Members of the teach-

ing profession who have received sabbatical leave on full or part salary will be considered on equal terms with other candidates.

4. There will be a Committee of Selection in whose hands, subject to ratification by the Board of Trustees, appointments will rest. This Committee will be authorized to take counsel with other experts with respect to the qualifications of each candidate.

5. The Committee of Selection will require evidence that candidates are persons of unusual attainments in advanced study, as shown by the previous publication of contributions to knowledge of high merit, or by exceptional aptitude for research; or that they are persons of unusual and demonstrated ability in some one of the fine arts. Definite and practicable plans for their proposed foreign study must be presented by all candidates. Statements of responsible scholars in their fields that such plans give promise of valuable results, and approval in advance of the candidates' plans for the foreign universities or professors with whom they expect to study, while not required, will add weight to an application.

The widest possible liberty will be given to Fellows in carrying out their work. Fellowships are not restricted to candidates interested in any particular field of knowledge, nor are they confined to academic or artistic subjects. They are open as well to candidates who are interested in the working of foreign systems of government, in the study of agricultural, social or business conditions, or in productive scholarship in the fields of the various learned professions—the only proviso being that in each case the candidates should look forward to making the results of their study available to the public and not merely to the utilization of them for their own private success. It is expected by the Trustees that Fellowships will ordinarily be used for study abroad and that Fellows will normally register at some foreign university or other institution of research; but this will not be required in cases where individuals demonstrate that their study can more profitably be pursued elsewhere.

7. The Trustees may subsidize the publication of important contributions to knowledge produced by holders of Fellowships on the Foundation; but they do not undertake to aid in publishing all works so produced.

8. Fellows are expected to present a complete report to the Foundation on retiring from their Fellowships, and informal reports at such times as the Foundation may suggest. Those who apply for reappointment must send preliminary reports of

their work with their applications for reappointment, which should be received at the office of the Foundation before the first day of March.

9. Applications for Fellowships should be made in writing, on or before January 1, 1926, by the candidates themselves in the form prescribed, addressed to Henry Allen Moe, *Secretary*, John Simon Guggenheim Memorial Foundation, 2300 Pershing Square Building, New York City. Application forms will be mailed to any address upon request.

THE 1900 PROGRAM AT DETROIT

If you would be interested in knowing what were the important problems of the veterinary profession a quarter of a century ago, just glance at the list of papers presented at the Detroit meeting of the A. V. M. A. in 1900.

"Labor, Rest and Confinement," by Dr. W. L. Williams, Ithaca, N. Y.
"Relation of Veterinary Medicine to the Public Health," by Dr. Wm. Herbert Lowe, Paterson, N. J.
Psoroptes Communis Equi and Bovis in Montana and N. W. Territory," by Dr. M. E. Knowles, Helena, Mont.
"Remote Effects of Drugs," by Dr. L. A. Merillat, Chicago, Ill.
"Examinating and Licensing of Stallions for Stud Purposes," by Dr. J. I. Gibson, Denison, Iowa.
"The Relation of Lymphatics to Meat Inspection," by Dr. Tait Butler, Indianapolis, Ind.
"Notes on the Tuberculin Test in Wisconsin," by Dr. G. Ed. Leech, Milwaukee, Wis.
"Rabies and Hydrophobia," by Dr. D. E. Salmon, Washington, D. C.
"Rabies," by Dr. D. S. White, Columbus, Ohio.
"Antiseptic Therapeutics," by Dr. J. F. Winchester, Lawrence, Mass.
"Practical Antiseptics," by Dr. G. A. Johnson, Sioux City, Iowa.
"Urinalysis in Veterinary Practice," by Dr. Pierre A. Fish, Ithaca, N. Y.
"Veterinary Progress in Michigan," by Dr. William Jopling, Owosso, Mich.
"Spavin, Its Etiology and Treatment," by Dr. W. J. Martin, Kankakee, Ill.
"Inoculation Against Texas Fever," by Dr. J. W. Connaway, Columbia, Mo.
"Snakes, Venoms and Antidotes," by Dr. E. M. Ranck, Philadelphia, Pa.
"Exercises in Veterinary Dentistry," by Dr. Robert W. Ellis, New York, N. Y.
"Obstacles to Enforcing Regulations Requiring Tuberculin Test in Inter-state Cattle Traffic," by Dr. Austin Peters, Boston, Mass.
"Control of Cattle Ticks," by Dr. Cooper Curtice, Raleigh, S. C.
"Difficulties in the Way of Municipal Meat Inspection in the South," by Dr. C. A. Cary, Auburn, Ala.
"Experimental Tuberculosis, Human and Bovine, in Domestic Animals," by Dr. R. R. Dinwiddie, Fayetteville, Ark.

BEE OWNERS LIABLE

Honey bees are domesticated animals and their owners are liable for such damage as they may perpetrate, the Mississippi Supreme Court has ruled, sustaining a decision awarding $250 damages to the owner of two mules which were stung to death.

ASSOCIATION MEETINGS

NORTH CENTRAL IOWA VETERINARY MEDICAL ASSOCIATION

The North Central Iowa Veterinary Medical Association met at Fort Dodge, Iowa, June 9, 1925, in the Chamber of Commerce rooms, at the Wahkonsa Hotel. The following program was presented after a short business session:

"The Veterinarian"—Dr. C. H. Stange, Dean, Veterinary Division, Iowa State College, Ames, Iowa.

"Small Animal Practice and the Breeding of Dogs"—Dr. A. F. McGreevy, Mallard, Iowa.

"Some Remarks on Poultry Practice"—Dr. W. P. Bossenberger, Williams, Iowa.

"The Eradication of Foot-and-Mouth Disease by the Bureau of Animal Industry" (Illustrated)—Dr. G. E. Golden, B. A. I., Sioux City, Iowa.

In his address Dr. Stange showed the necessity for the veterinarian keeping in close relation to the live stock owner, and thus be able to take care of any trouble that may arise, instead of permitting the live stock owner to take things in his own hands or to place them in the hands of untrained persons. Dr. Stange showed that the veterinarian has a place in our social structure and without him heavy losses to the live stock industry will be incurred.

The paper by Dr. McGreevy called attention to the fact that veterinarians should not only engage in small animal practice, but they should engage in the breeding of dogs. Any interest that is displayed by the profession in the breeding of pure-bred dogs—or other animals, for that matter—will stimulate the interest of the public-at-large along these lines, to the advantage of the veterinarian.

Dr. Bossenberger's paper made it plain that poultry practice can be made remunerative to the veterinarian. He touched upon the commonly encountered diseases of poultry, as well as the epizootics which occurred during the past winter and spring.

In the paper by Dr. Golden, the work of the Bureau of Animal Industry was described in a very interesting way. The subject was illustrated by excellent lantern slides.

The ladies in attendance were entertained at a theatre party by a committee consisting of the wives of the local veterinarians.

H. J. SHORE, *Secretary.*

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

The regular monthly meeting of the Veterinary Medical Association of New York City was held in the hospital of the American Society for the Prevention of Cruelty to Animals, 24th St. and Avenue A, February 4, 1925, at 8:30 p. m. President Bruce Blair presided.

The minutes of the January meeting were read and approved.

Dr. W. Reid Blair, chairman of the special committee appointed by the President, at the January meeting, to draw up suitable resolutions condemning the cropping of ears, reported for the committee. It was regularly moved and seconded that these resolutions be approved and copy sent to the American Humane Society, at Albany.

Drs. Adolph Eichhorn, J. F. DeVine, Jacob Borach, Trelford Miller, and Col. Bert English were elected to membership.

Dr. W. Reid Blair read an article from *The New York Tribune* on "The Snow Horse." This article referred to the French-Canadian and Morgan horses used in the North, where they toil belly-deep in snow and, instead of struggling, slowly plow their way along and display an intelligence derived from generations of forebearers developed under similar conditions.

This article mentioned that the federal census shows that the supply of horses in this country exceeds that recorded at the close of the War. There is a steady demand for two types—the heavy draft horse and the riding horse. More people are riding horses than ever before in every part of the country.

No further business appearing, President Blair turned the meeting over to Dr. Garbutt, chief surgeon for the A. S. P. C. A. Dr. Garbutt showed the entire party, of about sixty-five veterinarians, through the hospital, and presented a number of very interesting cases under treatment. He also demonstrated the use of the fluoroscope.

A splendid luncheon was served in the reception room of the hospital.

It was regularly moved and seconded that a vote of thanks be extended the A. S. P. C. A., for their hospitality in entertaining our Association, and Dr. Garbutt, for his labors in arranging for the meeting and the presenting of the many clinical cases.

No further business appearing, this very successful meeting adjourned.

March Meeting

The regular monthly meeting of the Veterinary Medical Association of New York City was called to order by the president, Dr. Bruce Blair, in the Academy of Medicine, 17 W. 43rd St., New York City, March 4, 1925, at 8:30 p. m.

Dr. John W. Adams, of the Veterinary Department of the University of Pennsylvania, was the speaker of the evening. His first remarks were on the subject of ear cropping. He stated that he was in sympathy with the Association in the condemning of this practice.

Dr. Adams next spoke on the diseases of the foot in the horse. This was a most interesting subject, and Dr. Adams was well able to describe the various operations, and the corrective shoeing necessary in foot diseases. During the course of his remarks, he pointed out that of the green horses put to work on city streets, 25 per cent showed ossification of the lateral cartilages, the first year; 64 per cent, the second year; 80 per cent, the third year; and 90 per cent, from the sixth to the eighth year. He also described the various operations for quittor in a masterly manner, and it proved to be a most profitable evening to all present.

Drs. Geo. H. Berns, R. W. Gannett, H. B. Risley, O. E. McKim, and others discussed diseases of the foot in the horse.

Dr. E. B. Ackerman exhibited a small English bull pup, three months old, suffering with dropsy.

The subject of liability insurance was taken up, and President Blair appointed a committee, consisting of Drs. O. E. McKim, Henry Amling, and J. E. Crawford, to report at the April meeting.

Drs. Edward R. Blamey, J. R. Sperry, and Arnold were elected to membership.

A rising vote of thanks was extended Dr. Adams for his contribution to the program.

No further business appearing, the meeting adjourned.

C. G. Rohrer, *Secretary.*

MISSOURI VETERINARY MEDICAL ASSOCIATION

The thirty-fourth annual meeting of the Missouri Veterinary Medical Association was convened at ? p. m., June 8, 1925, at the Royal Hotel, Excelsior Springs, Mo., with Dr. J. L. Jones presiding.

The program was intensely interesting throughout. The most outstanding presentations were:

"Anthelmintic Medication," Dr. Maurice C. Hall, U. S. Bureau of Animal Industry, Washington, D. C.

"Small Animal Hospital Equipment and Hospital Arrangement," (illustrated by motion pictures), Dr. J. C. Flynn, Kansas City, Mo.

"Hospital and Hospital Equipment for the General Practitioner Who Handles Small Animals," Dr. J. V. Lacroix, Evanston, Ill.

"Eradication of White Diarrhea of Poultry," Dr. Sivert Eriksen, pathologist, Missouri Experiment Station, Mountain Grove, Mo.

The incorporation of the Association under the laws of Missouri was officially completed by a motion accepting the Constitution and authorizing the Secretary to sign the names of the membership to same.

Resolutions were adopted expressing the appreciation of the Association of the work of the Missouri State Poultry Experiment Station in a campaign to eradicate bacillary white diarrhea in the various counties of the State; condemning the practice of cropping dogs' ears; and favoring the entrance of the United States into the World Court.

An excellent dinner was given the evening of the 9th, with Dr. J. C. Flynn acting as toastmaster, and followed by several interesting speakers.

A number of new members were received. The following officers were elected for the ensuing year: Dr. H. M. McConnell, Independence, Mo., president; Dr. E. A. Shikles, Dearborn, Mo., vice-president; Dr. Fred C. Cater, Sedalia, Mo., secretary-treasurer.

The meeting adjourned to meet in St. Louis, in 1926, with the possibility of a joint meeting with the Kansas Veterinary Medical Association, at the American Royal at Kansas City, this fall, if same can be arranged.

FRED C. CATER, *Secretary.*

WABASH VALLEY VETERINARY ASSOCIATION

The Wabash Valley Veterinary Association held its annual meeting and fish-fry at Meron, June 19, 1925. Forty-eight veterinarians and their families were in attendance and enjoyed the program and feast.

Dr. J. E. Gibson, of Indianapolis, B. A. I. inspector-in-charge of tuberculosis eradication in Indiana, addressed the meeting on the progress of the work. Dr. Gibson stated that over 260,000 herds of dairy cattle had been tested last year, and predicted that the Indiana law would enable the officials to reduce the amount

of tuberculosis in the State to less than two per cent in the near future. Dr. Ellis Tade, a physician, of Bicknell, praised the work being done under Dr. Gibson's leadership.

Dr. Frank H. Brown, of the State Veterinary Department, gave a very interesting talk, stating that twenty-six counties in Indiana are now working on the area plan and that several are on the waiting list. Dr. Brown stated that many poultry raisers were having their flocks tested for tuberculosis.

Dr. J. M. Tade, of Vincennes, the retiring president of the Association, delivered an address in which he thanked the members for the hearty cooperation that they had given him while in office. The Association, founded twenty years ago with four members, has grown until it now extends its field of usefulness over Lawrence, Crawford, and Wabash counties, in Illinois, and Gibson, Posey, Pike, Knox, Daviess, Martin, Green, Sullivan, and Vigo counties, in Indiana.

Officers for the year were elected as follows: President, Dr. W. B. Ridgeway, of Robinson, Ill.; vice-president, Dr. H. H. Yokum, of Freelandville, Ind.; secretary-treasurer, Dr. M. W. Scott, of Vincennes, Ind.

The next meeting will be held at Washington, Indiana, September 18, 1925. A chicken dinner will be an added attraction.

M. W. Scott, *Secretary.*

MICHIGAN STATE VETERINARY MEDICAL ASSOCIATION

The forty-third annual meeting of the Michigan State Veterinary Medical Association was held at the Michigan State College, June 23-24-25, 1925. About one hundred and twenty-five veterinarians, about sixty of whom were accompanied by their wives, were present a part or all of the three days.

President H. Preston Hoskins called the meeting to order, and an address of welcome was given by Dr. K. L. Butterfield, president of the College. Dr. W. N. Armstrong replied to this address in a very able manner.

Dr. Hoskins then read the customary presidential address, which was a masterpiece, and gave those who were present many things to think about.

One of the features of the meeting was the presence of Dr. L. A. Merillat, president of the A. V. M. A., who gave several interesting talks and entered into the discussions with a vim.

The writer was pleased to note how Dr. Merillat always tried to look at things from the practitioner's standpoint.

"Problems of the Dairy Breeder" was the subject of a talk by Professor O. E. Reed, of the Dairy Department of the College. Professor Reed pointed out many things the veterinarian could do to be of greater service to the breeder. One point of his address was that a purchaser of offspring from a dam should not depend too much on the dam's record, because box-stalls, blankets, two feet of bedding, and things of that nature are not transmitted to the sons and daughters.

To pass away the first evening, an informal get-together was held in the Armory, during which a radio program was enjoyed. One of the speakers paid splendid tribute to the stepmothers of the human race, those meek-eyed chewers of grass, and to the veterinarians who attend them, and brush the clammy dews of death from their placid brows, and listen to the final rumble of their rumens.

The morning of the second day was given over to a large and small animal clinic. Dr. Merillat performed the French quittor operation. Tumors were removed from a cow's udder by Dr. A. J. Kline. Dr. E. E. Patterson treated a case of contracted flexor tendons of the fore limb on a fox, and Dr. J. P. Hutton operated on a large ventral hernia in a bitch.

Following the clinic, Hon. L. Whitney Watkins, Commissioner of Agriculture, told of the relation of his department to the practicing veterinarian. His talk was followed by one on "Abortion and Sterility," given by Dr. W. L. Boyd, of the University of Minnesota. Needless to say, the Doctor covered his subject in a very thorough manner. The subject of "Parturient Paresis and Its Complications" was very interestingly presented by our president-elect, Dr. F. E. Stiles, of Battle Creek, who enjoys an extensive dairy practice in the region of the Food City.

The evening was spent about the banquet tables in the Armory. Following the prehension of the food, Dean Giltner acted as toastmaster and introduced the speaker of the evening, Mr. Howard Rather, of the Agricultural Division of the College, who showed how the raising of more alfalfa and less timothy was taking the nitrogen out of the air, and thus concentrating the oxygen, which accounts for the high speed at which people are going these days. Other splendid speeches were given by Drs. Merillat and Boyd. Several of the wives and daughters of the members present helped with the entertainment.

The program for the last day of the meeting was furnished by members from each of the eight local veterinary associations throughout the State. This has been a feature of the annual meeting for a couple of years, and has proved very successful, for the majority of the speakers are practitioners. Dr. G. W. Rawson, represented the Southeastern Michigan Association, with a paper on "The Treatment for the Common Intestinal Worms in Small Animals." The Michigan-Ohio Association was represented by Dr. A. J. Kline, with an interesting case report; the Western Michigan Association by Dr. S. Tacoma, on "The Etiology and Handling of Some Forms of Paraplegia in Cattle." "The Eradication of Tuberculosis from Hillsdale County" was discussed by Dr. A. B. Curtice, representing the Hillsdale County Association. The Central Michigan Association was represented by Dr. M. Olthouse, on the subject of "Rabies," and the Saginaw Valley Association was represented by Dr. F. T. Cates, on the subject of "Removal of Chokes."

The question box was well handled by Dr. W. N. Armstrong, and brought forth many interesting discussions.

Officers elected for the coming year are as follows: President, Dr. F. E. Stiles, Battle Creek; 1st vice-president, Dr. W. E. Coomer, Bay City; 2nd vice-president, Dr. L. A. Wileden, Mason; 3rd vice-president, Dr. W. N. Armstrong, Concord; secretary-treasurer, Dr. Edw. K. Sales, East Lansing; members of Board of Directors, Dr. F. M. Blatchford, Brighton (six years); and Dr. H. Preston Hoskins, Detroit (three years.)

E. K. SALES, *Secretary.*

TUBERCULIN TESTING IN MAINE

Dr. George H. Potter, accredited veterinarian of Portland, Maine, has just completed testing the cattle in the Brunswick-Topsham milk area of Maine. He tested approximatly 1000 head of cattle and found seven reactors; most of the reactors were additions to herds or from previously-tested diseased herds.

Dr. M. E. Maddocks, accredited veterinarian of Augusta, Maine, is engaged in retesting cattle in accredited herds in Kennebec County, Maine.

Dr. R. B. Stanhope, accredited veterinarian of Belfast, Maine, is engaged in retesting the accredited herds in Waldo County. Ninety per cent of the cattle is that county have been turned back to accredited veterinarians.

NECROLOGY

JOHN RALPH GRIGSBY

Dr. John R. Grigsby, of Wray, Colo., died November 18, 1924, following an operation made necessary by an attack of appendicitis, six days previously.

Born in Wray, June 30, 1894, Dr. Grigsby attended the Yuma County High School and studied veterinary medicine at the Colorado Agricultural College, from which he was graduated in 1917. He then entered the Army as a second lieutenant. He soon saw service overseas, having been in France late in 1917. Two years later he was honorably discharged, with the rank of first lieutenant. He later enlisted in the Reserve Corps and held the rank of captain.

Dr. Grigsby joined the A. V. M. A. in 1917. He was a member of Alpha Psi Fraternity, Wray Lodge No. 71, A. F. & A. M., Colorado Consistory No. 1, and also a Shriner. He is survived by his widow, his parents, a sister and a brother.

ILDEFONSO PATDU

Dr. Ildefonso Patdu, of the Veterinary Research Laboratory, Pandacan, Manila, Philippine Islands, died following a cerebral hemorrhage, June 2, 1925.

Born at Bacalor, Pampanga, P. I., May 22, 1882, Dr. Patdu attended primary and secondary schools, and received his veterinary degree, in 1915, from the College of Veterinary Science of the University of the Philippines.

Dr. Patdu joined the A. V. M. A. in 1919. He was also a member of the Philippine Veterinary Medical Association, which organization met on June 8, 1925, and adopted the following resolution:

WHEREAS, Dr. Ildefonso Patdu was an active member of the Philippine Veterinary Medical Association, and

WHEREAS, The Almighty has recalled him to a better life and deprived us of a good friend, a worthy colleague and a pioneer in the development of veterinary science in the Philippines, therefore, be it

Resolved, As it is hereby resolved by the Philippine Veterinary Medical Association, on this 8th day of our Lord, to unanimously convey our sympathy to the family of the deceased for this irreparable loss, and be it further

Resolved, That copies of this resolution be sent for publication to the press and the JOURNAL of the American Veterinary Medical Association.

WILLIAM ABBOTT BOUCHER

Dr. William A. Boucher died suddenly, May 22, 1925, at his home in Pasadena, Calif. The day before his death, Dr. Boucher's physician had examined him and prescribed complete rest, on account of the condition of his heart. Death came the next morning, at 8 o'clock, following a bath.

Born in Ottawa, Canada, April 7, 1876, he attended the Ontario Veterinary College and was graduated in 1901. The following year, he located in Southern California, first at Fullerton. Five years later, he removed to Pasadena, and soon became closely identified with the community and civic affairs.

An obituary notice in *The Pasadena Star-News* paid Dr. Boucher the following tribute:

> "His love of all animals was not the merely technical interest of the professional man. He was fond of horses and dogs, and knew them as most men know their human friends. He was, moreover, a genuine sportsman in the better sense. He was an expert rider, a polo player, a golfer, and was interested in all athletic sports. As a horseman, he had for many years been interested in local horse shows, riding events, and the like. Dog shows claimed his attention no less. Of a gregarious nature and possessed of a kindly heart, it followed that he made hosts of friends in the many contacts that he had."

Dr. Boucher joined the A. V. M. A. in 1910. He was a member and former president of the California State Veterinary Medical Association. He was exalted ruler of the Pasadena Elks' Lodge, 1922-23; a member of Corona Lodge, F. & A. M. and of Scottish Rite Consistory; also, a Shriner. Several years ago, as grand marshal, he conducted the floral pageant in connection with Pasadena's famous Tournament of Roses. He was a director of the Boys' and Girls' Aid Society, and a member of the Pasadena Advisory Board for the Salvation Army.

He is survived by his widow, his father and mother, and one sister.

JAMES WILLIAM BRODIE

Dr. James W. Brodie, of Pontiac, Mich., was found dead in bed at his home, June 20, 1925. He had appeared in his usual good health the night before. Death came during the night, probably from organic heart trouble.

Born at Ringwood, Ontario, October 31, 1858, he attended the common schools and entered the Ontario Veterinary College, from which he was graduated in 1884. He located in Pontiac

immediately, and built up a large practice throughout Oakland County.

For many years, Dr. Brodie was connected with the city health department of Pontiac, in the capacity of meat inspector. Pontiac was one of the first cities in Michigan to have municipal meat inspection, and Dr. Brodie was city meat inspector from the beginning of the work. He was one of the first practitioners in Michigan to employ the intradermal tuberculin test. He was among the pioneers in abortion and sterility work.

Dr. Brodie joined the A. V. M. A. in 1924. He was a member and past president (1910-11) of the Michigan State Veterinary Medical Association. He was a member and past vice-president (1921-22) of the Southeastern Michigan Veterinary Medical Association. He was a member of the Elks and Masonic lodges of Pontiac, having been a charter member of the latter.

A little over a year before his death, Dr. Brodie was honored by his colleagues, upon the completion of forty years of active practice. The 1924 spring meeting of the Southeastern Michigan Veterinary Medical Association was a sort of birthday party for Dr. Brodie, who was surprised to find himself one of forty veterinarians gathered to do him honor. A beautiful cake in the form of a book, bearing forty candles, and appropriately inscribed, was placed before him at the head of the table. Although deeply moved, Dr. Brodie accepted the cake in his usual hearty manner.

Dr. Brodie was unmarried. He left three sisters, three brothers, and a number of nieces and nephews, among whom his fairly large estate will be divided.

EDWARD H. BERRY

On the morning of Friday, June 26, 1925, Dr. E. H. Berry, of Leland, Miss., while under a temporary spell of melancholy, ended his own life by firing a bullet into his head. The cause of the act is attributed to financial worries and ill health. Dr. Berry underwent a major operation in December last, from which he had never fully recovered. As soon as possible after his death, many veterinarians rushed to Leland to offer assistance to the bereaved family, Drs. C. D. Crawford, B. T. Huston, O. M. and E. S. Norton being the first to reach there.

Dr. Berry was a graduate of the Kansas City Veterinary College, class of 1917. He returned to his home town, Tuscumbia,

Mo., after his graduation, where he was engaged in practice until the beginning of the following year, when he entered the Army. He served in the Veterinary Corps until the end of the War, and came to Leland, where he was in practice up to the time of his death. Dr. Berry is survived by his excellent wife and two step-children.

Dr. Berry was one of the noble men of the veterinary profession. He was an industrious, sober, honest, and conscientious practitioner and, during his life in Mississippi, he was the paragon of ethical dealings. He was of a trusting, forgiving nature, and was always liberal in his judgment of others. He never held malice against any man, but his sensitive, temperamental being was easily injured by the cruel, merciless ways of a commercial world. The following is a clipping from his home paper, which goes to show the high esteem which his people had for him:

> "The people of Leland are plunged into depths of sadness on account of the sudden death of one of its most beloved citizens, Dr. E. H. Berry. He was an eminent veterinarian, a splendid citizen, a deacon of the First Presbyterian Church. He was a Mason and a member of the Frank G. Wingfield Post of the American Legion."

Dr. Berry joined the A. V. M. A. in 1918. He was a member of the Mississippi Delta Veterinary Medical Association and the Mississippi State Veterinary Medical Association. He was always for the right, and maintained his professional dignity above all other things.

The funeral services were held at Dr. Berry's residence in in Leland, at 4:30 p. m., June 27, and were conducted by the Rev. Doctor Bitzer, assisted by the American Legion. The body was carried to its last resting place in the beautiful Leland-Stoneville Cemetery. All flags of the little city were at half-mast during the ceremony, and hundreds of Dr. Berry's friends were in attendance. The Mississippi Delta Veterinary Medical Association and the Mississippi State Veterinary Medical Association sent handsome wreaths.

C. G. S.

WILLIAM JOPLING

Dr. William Jopling was found dead in bed in his room at the European Hotel, Kalamazoo, Mich., July 5, 1925. The coroner attributed his death to heart failure.

For many years following his graduation from the Ontario Veterinary College, in 1883, Dr. Jopling enjoyed a very lucrative

practice at Owosso, Mich. Later he practiced at North Star and Rose City, Mich. Between the times that he was located at these points, he was located in Des Moines and Cherokee, Iowa. In 1923 he decided to go to California and for almost a year he was associated with Dr. C. C. Warn, in Los Angeles. In 1924, after attending the Des Moines meeting, he returned to Michigan, and was associated with Dr. O. G. Davidson, of Kalamazoo. A short time before his death he started in practice again for himself.

Dr. Jopling was also a graduate of the Ontario Agricultural College, class of 1878. He was at one time an inspector in the employ of the B. A. I. He joined the A. V. M. A. in 1892 and served as Resident Secretary for Michigan, 1892-94. He was a member of the Michigan State Veterinary Medical Association and served two terms as president, 1899-00 and 1900-01. During the nineties he was a frequent contributor to veterinary literature. He was well read, had an unusually keen mind and well developed powers of expression.

Just before leaving Michigan for California, two years ago, Dr. Jopling gave his entire veterinary library to the A. V. M. A. As a matter of fact, his donation of books constituted the nucleus for the present A. V. M. A. library.

CHARLES C. LYFORD

Dr. Charles C. Lyford, one of the oldest graduate practitioners in the United States, died at Roscoe, Illinois, June 30, 1925, age 72 years. Dr. Lyford received the degree of B. S. from the University of Illinois, in 1875. He was awarded the degree of V. S. by the Montreal Veterinary College, in 1877; the degree of M. D. from McGill University, in 1880; and the degree of D. V. S. from McGill University, in 1890. He studied for some time under Dr. Osler, who at that time was at McGill University. He was in practice in Minneapolis for 45 years. From 1880 to 1890 he was city veterinarian.

Dr. Lyford joined the A. V. M. A. in 1884. He was a charter member (1897) of the Minnesota State Veterinary Medical Association and its president in 1902. He always retained his interest in these organizations. Dr. Lyford was always particularly interested in the breeding of Standardbred horses and maintained his interest to the last. Recently Dr. Lyford had

been in practice at Osseo, Minnesota. He was in poor health for some time, and final diagnosis being carcinoma of the liver.

He is survived by his wife, one daughter, and three sons; Mrs. Frank E. Randall, of Omaha, Nebraska; Darth, of Los Angeles, Calif.; Kenneth, of San Francisco, Calif; and Chester D., of Minneapolis, Minn.

C. P. F.

MARRIAGES

Dr. John B. McQuown (O. S. U. '19), of Ada, Ohio, to Miss Martha Jeane Perkey, of Lima, Ohio, March 11, 1925, at Cincinnati, Ohio.

Dr. J. I. Gartrell (St. Jos. '18), of Mead, Nebr., to Miss Lillian Hamann, of Omaha, Nebr., April 18, 1925.

Dr. Thomas J. Quinn (U. P. '10), of Darby, Pa., to Miss Mae Weber, April 29, 1925, at Darby, Pa.

Dr. Ralph W. Hixson (K. S. A. C. '20), of Falls City, Nebr., to Miss Glenna Griffin, same city, May 28, 1925.

Dr. F. C. Maus (Corn. '23), of Johnson City, N. Y., to Miss Alma Quick, June 11, 1925, at Ithaca, N. Y.

BIRTHS

To Dr. and Mrs. K. R. Dudley, of Colony, Kans., a daughter, Ruth Joan, April 16, 1925.

To Dr. and Mrs. L. V. Skidmore, of Lincoln, Nebr., a daughter, Rosalie Margaret, May 14, 1925.

To Dr. and Mrs. W. I. Wiedemeyer, of Carroll, Iowa, a son, Joseph, Jr., June 10, 1925.

To Dr. and Mrs. Morris Scherago, of Lexington, Ky., a son, Earl James, June 14, 1925.

PERSONALS

Dr. H. L. Morency (Colo. '25) has located at Boulder, Colo.

Dr. H. L. Messmore (Chi. '14) has removed from Atkinson to Geneseo, Ill.

Dr. J. T. Gardner, formerly of Paducah, Ky., is now practicing in Hickman, Ky.

Dr. J. M. Jennings has returned to Warsaw, Ind., after an absence of two years.

Dr. R. A. Moye (Iowa '17) has been appointed Delaware County (Iowa) Veterinarian.

Dr. John Enama (K. C. V. C. '18) has removed from Lake City, Minn., to Dassel, Minn.

Dr. James A. Sluss (Ind. '21) has changed locations, from Rhodell, W. Va., to Bluefield, same state.

Dr. W. V. Glaisyer (Wash. '06), of Coquille, Ore., is Herd and Meat Inspector for Coos County.

Dr. L. H. Morin (Chi. '10) ,for the past eleven years located at Waynesville, Ill., has removed to Clinton, Ill.

Dr. C. G. Warner (Chi. '98), of Paducah, Ky., lost his veterinary hospital by fire, the latter part of May.

Dr. R. C. Dickson (K. C. V. C. '18) has requested a change of address, from Jefferson City to Fayette, Mo.

Dr. R. M. Platt (K. S. A. C. '10), formerly at Hoopup, Colo., gives Coldwater, Kansas, as his new address.

Dr. Hy Wild (McK. '09), who has been at Boulder Junction, Wis., for some time, is now back at Hartland, Wis.

Dr. Claude A. Henley (O. S. U. '21) is associated in practice with his father, Dr. R. C. Henley, at Jacksonville, Ill.

Dr. F. C. Maus (Corn '23) is in practice at Johnson City, N. Y., and is also City Meat and Dairy Inspector.

Dr. G. A. Unbewust (Wash. '16), formerly of Harrington, Wash., gives Lebanon, Oregon, as his new address.

Dr. S. L. Brown (Wash.) has removed from Pullman, Wash., to Portland, Ore. Address: 1292 East 31st Street, N.

Dr. H. B. Mitchell (U. P. '12) has been appointed Dairy Inspector for the Lancaster (Pa.) Bureau of Milk Inspection.

Dr. John J. Martin (U. S. C. V. S. '17), formerly of Newark, N. J., gives us a new address: 1011 Grove Street, Irvington, N. J.

Dr. C. L. Kern (Corn. '24), formerly in practice in Atlanta, Ga., is now with the Dairymen's League, at Middletown, N. Y.

Dr. Milton Fisher (O. S. U. '25) has succeeded his father, Dr. Robert F. Fisher, as City Meat and Milk Inspector of Paducah, Ky.

Dr. Arvid W. Nyline (Iowa '25) has purchased a one-half interest in the practice of Dr. C. C. Glendenning (Ont. '89), at Clinton, Ill.

Drs. D. A. Eastman (Iowa '22) and A. R. Menary, of Cedar Rapids, Iowa, are veterinarians to the Linn County (Iowa) Humane Society.

Dr. Joseph Patt (K. C. V. C. '93), of Mobile, Ala., arrived in Berlin, Germany, May 28, according to a postal card received by the Editor.

Dr. G. H. Caldwell (Chi. '15), formerly of Delavan, Ill., is now associated in practice with his brother, Dr. F. W. Caldwell, at Wheaton, Ill.

Dr. J. F. Shigley (Corn. '15) has been promoted to an associate professorship in veterinary science, at the Pennsylvania State College, State College, Pa.

Dr. T. E. Munce (U. P. '04), state veterinarian of Pennsylvania, recently sprained an ankle as the result of a fall, and is obliged to walk with crutches.

Dr. J. R. Stifler (U. S. C. V. S. '11), formerly of Stanford, Ky., has located at Morganfield, following his appointment as Assistant State Veterinarian of Kentucky.

Dr. C. E. Mummert (Ind. '07), of Young America, Ind., recently delivered a lecture, "Testing Chickens for Bacillary White Diarrhea," before the local farm bureau.

Dr. J. L. Hetherington (Ind. '11) has been nominated for mayor by the Republicans of Bloomington, Ind., at a special election. The regular primary election resulted in a tie.

Dr. A. D. Knowles (K. C. V. C. '06), for some years in practice at Missoula, Montana, has joined the ranks of Florida-bound, and will make his future home at West Palm Beach.

Dr. John H. Winstanley (U. P. '10) recently made a trip to the Atlantic seaboard in connection with some piscatorial investigations. It is reported that the trip was a remarkable success.

Dr. John W. Harrigan, of Philadelphia, Pa., recently suffered a broken leg and was confined to his home for several weeks. He is reported to be making rapid progress towards recovery.

Dr. William H. Shannon (U. P.), of Boston, Mass., was graduated from the Suffolk Law School, of Boston, June 3, 1925. He is reported as having stated that he will continue in veterinary practice.

Dr. Fred D. Wood (U. P. '24), who has been resident surgeon at the hospital of the School of Veterinary Medicine, University of Pennsylvania, during the past year, has started in practice at Ardmore, Pa.

Dr. W. D. James (Ind. '17), of Greencastle, Ind., is encouraging horseback riding among the members of the fair sex by offering saddle horses at one-half the customary rate to members of the Women's Athletic Association of De Pauw University.

Dr. C. J. Marshall (U. P. '94), Professor of Medicine and Ambulatory Clinic, Veterinary School ,University of Pennsylvania, is basking at his "Tinker Hill Farm," in Bradford County, Pennsylvania. When not otherwise engaged, Dr. Marshall spends his time looking over his fine herd of registered Ayrshire cattle.

Dr. F. W. Morgan (McK. '06) has been appointed City Meat Inspector of Chattanooga, Tenn. He will be in charge of the Division of Dairy and Meat Inspection of the Bureau of Sanitation and Inspection. Dr. Morgan was also recently appointed veterinarian in charge of the animal shelter of the Chattanooga Humane Educational Society.

Dr. H. E. Van Der Veen (Chi. '17), formerly of Lake Geneva, Wis., has been promoted and transferred to Chicago, c/o Borden's Farm Products Company of Illinois, 2800 North Talman Avenue. Dr. Van Der Veen was veterinarian in charge of production inspection of selected milk, at Lake Geneva. He is now manager of Borden's Chicago branch, which bottles 250,000 pounds of milk daily.